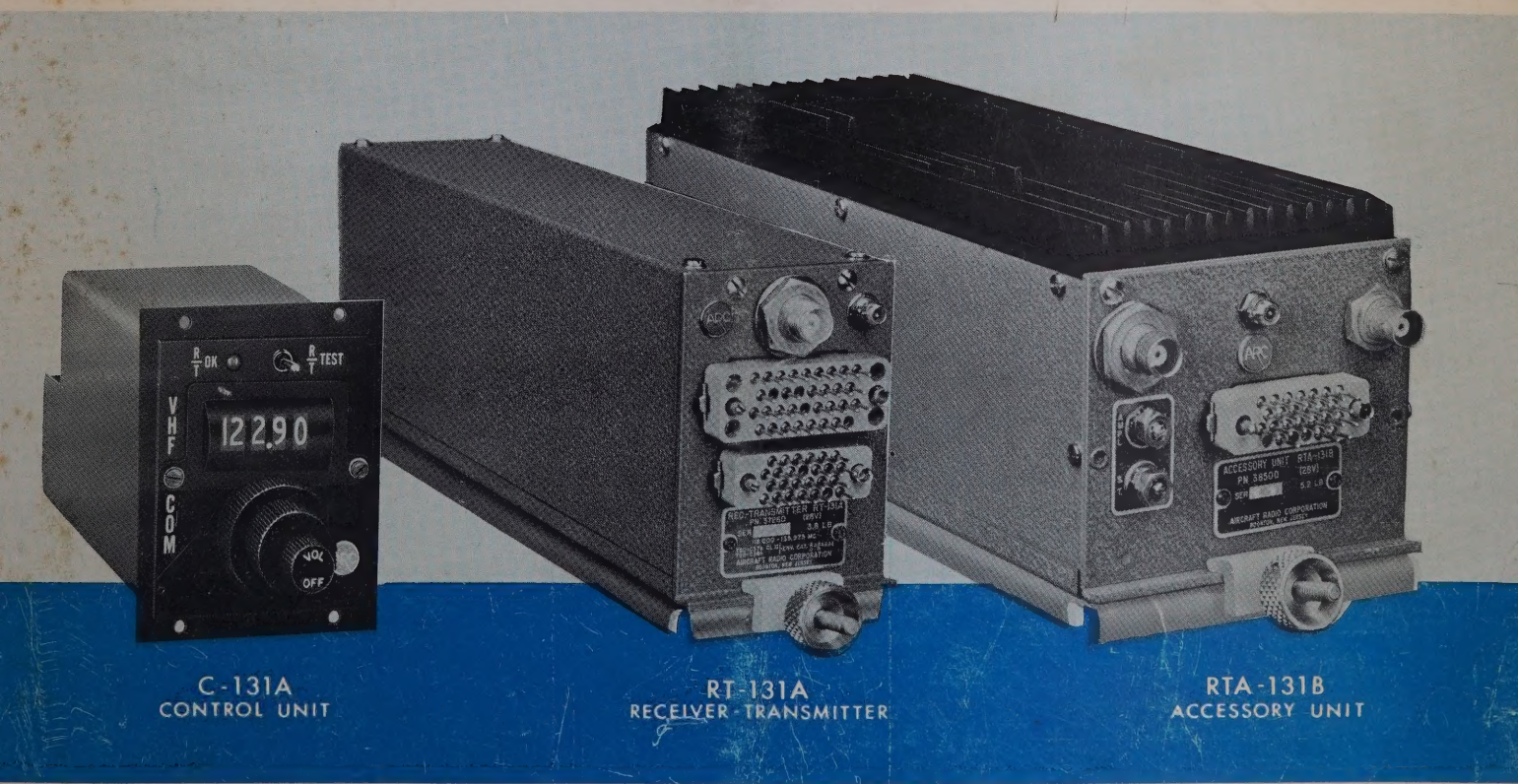
INSTRUCTION BOOK

131B

Communication Set

Aircraft Radio Corporation · Boonton · New Jersey



C-131A
CONTROL UNIT

RT-131A
RECEIVER-TRANSMITTER

RTA-131B
ACCESSORY UNIT

INSTRUCTION BOOK

131B

Communication Set

Aircraft Radio Corporation
Boonton · New Jersey

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This Warranty shall not apply to any ARC product which, in the judgment of ARC, has been repaired or altered in any way so as to adversely affect its performance or reliability or which has been subject to misuse, negligence, or accident.

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The information in this instruction book does not profess to include all the details of design, production, or variations of the equipment, or to cover all the possible contingencies which may arise during operation, installation, or maintenance. Should special problems arise or further information be desired, contact the Field Engineering Department of Aircraft Radio Corporation.

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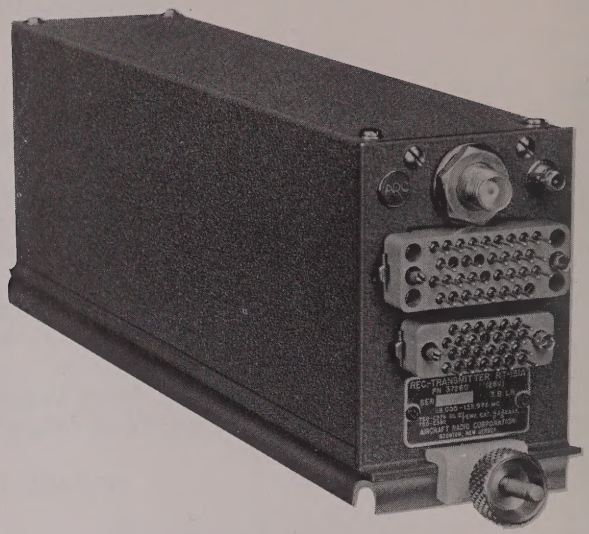
C-131A
CONTROL UNIT



RT-131A RECEIVER-TRANSMITTER
WITH
MOUNTING 36450

RTA-131B ACCESSORY UNIT
WITH
MOUNTING 34980

Figure 1–1. 131B Communication Set

FCC LICENSING DATA

Application for an aircraft radio station license for the RT-131A Receiver-Transmitter of the 131B Communication Set must be made on FCC Form 404. In response to Question 14, insert:

Manufacturer	*Type No.*
Aircraft Radio Corporation Boonton, New Jersey, U.S.A.	RT-131A

SECTION 1
GENERAL INFORMATION

1–1. INTRODUCTION.

This instruction book contains installation, operation, maintenance, and parts information for the 131B Communication Set, manufactured by Aircraft Radio Corporation, Boonton, New Jersey. The units of the 131B are shown in Figure 1–1.

1–2. PURPOSE.

The 131B VHF Communication Set is a solid-state, remotely controlled, communications set capable of receiving and transmitting voice communications on any of 720 channels between 118.000 and 135.975 MHz.[1] The 720 channels are synthesizer controlled and are spaced 25 kHz apart.

1–3. SPECIFICATIONS.

General Characteristics.

Frequency Range:	118.000-135.975 MHz[1]
Number of Channels:	720[1]
Channel Spacing:	25 kHz
Frequency Stability:	±.002%
Input Power Requirement:	Receive: 1.5 amperes at 27.5 volts dc Transmit: 6.5 amperes at 27.5 volts dc
Weights and Dimensions:	See Figures 2–1 through 2–5
Certification:	
RT-131A:	TSO-C37b Class I, Env. Cat. $^{A}_{D}A^{A}_{B}AAAE$
	TSO-C38b Env. Cat. $^{A}_{D}A^{A}_{B}AAAE$
RTA-131B:	TSO-C37b Class I, Env. Cat. $^{A}_{D}A^{A}_{B}AAAE$
	TSO-C38b Env. Cat. $^{A}_{D}A^{A}_{B}AAAE$
C-131A:	TSO-C37b Class I, Env. Cat. $^{A}_{D}AAAAAE$
	TSO-C38b Env. Cat. $^{A}_{D}AAAAAE$
Mounting 36450:	TSO Env. Cat. $^{A}_{D}AB$ - - -
Mounting 34980:	TSO Env. Cat. $^{A}_{D}AB$ - - -
Mounting 36280:	TSO Env. Cat. $^{A}_{D}AA$ - - -
Mounting 36320:	TSO Env. Cat. $^{A}_{D}AA$ - - -

[1] With internal control stops removed, equipment is capable of operation on 800 channels between 116.000 and 135.975 MHz.

Receiver.

Circuit:	Double-conversion superheterodyne
Sensitivity:	2.0 μV or less for 6 dB S+N/N ratio
Image Rejection:	At least 70 dB down
Selectivity:[1]	Total bandwidth at 6 dB: 36 kHz Total bandwidth at 60 dB: 66 kHz
Headset Audio:	5.0 volts across 250 ohms at 1000 Hz, 30 percent modulation
Audio Response:	350 to 2500 Hz, 6 dB bandwidth

Transmitter.

Power Output:	20 watts, nominal
Modulation Capability:	85 percent minimum
Rated Duty Cycle:	1 minute on, 4 minutes off

Speaker Amplifier.

Output:	Rated at 10 watts into 4-ohm load
Audio Channels:	9

1–4. UNITS AND ACCESSORIES.

Table 1–1 lists the units and accessories available for a 131B installation.

1–5. EQUIPMENT REQUIRED BUT NOT SUPPLIED.

Interconnecting cable assemblies are not supplied but must be fabricated from individual wires and RG-58/U coaxial cable (not supplied) and the connectors listed in Table 1–1. The wire sizes required to fabricate the interconnecting cables are specified in Figure 2–9. The actual lengths of the wires and cables will depend on the location of the equipment in the aircraft.

A VHF communication antenna is required for use with the 131B. The A-25D or the A-29C Antenna is recommended, but any comparable antenna may be substituted.

[1] When ground station frequency tolerances are compatible with 25-kHz channel spacing, the crystal filter may be replaced to provide the following selectivity: total bandwidth at 6 dB, 22 kHz; at 60 dB, 34 kHz.

1–6. DESCRIPTION OF UNITS.

Receiver-Transmitter. The RT-131A Receiver-Transmitter is a solid-state unit which includes all the receiver circuits and the exciter portion of the transmitter. The receiver-transmitter covers the VHF communication frequencies between 116.000 and 135.975 MHz. A frequency synthesizer is used to provide 800 channels spaced .025 MHz (25 kHz) apart. The frequency synthesizer uses solid-state logic, digital, and linear circuits to produce the selected transmitter r-f frequency and the corresponding receiver local oscillator signal. Seven microcircuit networks are used in the i-f and audio circuits of the receiver.

The receiver includes an automatic squelch circuit which analyzes the received signal for readability. If the signal has acceptable quality based on a signal-to-background-noise ratio, the squelch opens the audio channel so that the signal can be heard. The receiver provides an aural output for headset operation and includes circuitry for connecting nine audio outputs through the accessory unit for speaker amplification. A crystal-controlled self-test circuit produces signals for testing most of the receiver and the transmitter circuits. The only circuits not tested by the self-test signals are the output frequencies of the frequency synthesizer and the receiver antenna input and filter circuits.

The receiver-transmitter is base-mounted in any convenient location. All electrical connections to the receiver-transmitter are made through four connectors on the front of the unit.

Accessory Unit. The RTA-131B Accessory Unit is an all-transistorized unit which includes all of the transmitter circuits except the exciter. It also includes a modulator-amplifier circuit which functions as a modulator during transmit condition and as a speaker amplifier during receive condition. Regulator circuits provide regulated voltages for the receiver and the transmitter, and a transient protector switch circuit protects most of the circuits of the set from transient voltages on the primary input line.

A coaxial relay in the accessory unit permits the use of a common antenna for reception and transmission, and a signal sensor and delay circuit prevents the application of an r-f signal to the transmitter until the antenna has been switched to the transmitter circuits. An SWR detector circuit samples the VSWR of the antenna circuit and turns off the transmitter when the antenna circuit presents an improper load.

The accessory unit is base-mounted in any convenient location. Electrical connections are made through four connectors on the front of the unit.

Control Unit. The C-131A Control Unit provides remote control of the 131B Communication Set. Power for the set and the audio output level (volume) of the receiver are

TABLE 1–1. UNITS AND ACCESSORIES

Qty	Name	Type No.	Part No.
1	Receiver-Transmitter	RT-131A	37260
1	Accessory Unit	RTA-131B	38500
1	Control Unit	C-131A	[1] 37250-0000
		C-131A	[1] 37250-2000
		C-131A	[1] 37250-3000
1	Mounting, Rigid (for RT-131A)[1]	—	36450
1	Mounting, Vibration-isolated (for RT-131A)[1]	—	36280
1	Mounting, Rigid (for RTA-131B)[1]	—	34980
1	Mounting, Vibration-isolated (for RTA-131B)[1]	—	36320
1	Antenna[2]	A-25D[1]	37670
		A-29C[1]	[3] 35180-0000
		A-29C[1]	[3] 35180-0200
2	Connector Kit, consisting of:	—	[1] 37546-0007
		—	[1] 37546-0008
1	Connector	—	35860-0034
33	Contact, Solder-type (supplied with 37546-0007)	—	35861-3020
33	Contact, Crimp-type (supplied with 37546-0008)	—	35861-2020
1	Polarizing Plug	—	35861-0002
1	Guide Pin	—	35862-0002
1	Guide Socket	—	35862-0001
1	Lever and Pivot Set	—	29916-0002
1	Shell	—	36048-0034
2	Connector Kit, consisting of:	—	[1] 37546-0005
		—	[1] 37546-0006
1	Connector	—	35860-0026
4	Contact, Solder-type (supplied with 37546-0005)	—	35861-3016
4	Contact, Crimp-type (supplied with 37546-0006)	—	35861-2016
21	Contact, Solder-type (supplied with 37546-0005)	—	35861-3018
21	Contact, Crimp-type (supplied with 37546-0006)	—	35861-2018
1	Polarizing Plug	—	35861-0002
1	Guide Pin	—	35862-0002
1	Guide Socket	—	35862-0001
1	Lever and Pivot Set	—	29916-0002
1	Shell	—	36048-0026
2	TNC Connector, Solder-type[1]	—	28776
2	TNC Connector, Crimp-type[1]	—	36608
2	MB Connector, Solder-type[1]	—	36798
2	MB Connector, Crimp-type[1]	—	36609
(4)	BNC Connector, Solder-type[1]	—	11337
(4)	BNC Connector, Crimp-type[1]	—	36607

[1] Alternative items; supplied as specified.
[2] Optional.
[3] Part No. 35180-0000, has centered connector. Part No. 35180-0200, has off-center connector.
[4] One BNC connector, either solder- or crimp-type, is supplied. An additional BNC connector, for use with the antenna, is optional.

controlled by an on-off switch combined with a potentiometer. The receiver-transmitter operating frequency is selected by two frequency selector controls and displayed by a digital readout indicator. A removable mechanical stop limits frequency selection to domestic communication operating frequencies between 118.000 and 135.975 MHz.

A toggle switch selects the self-test function for the receiver or transmitter circuits, and a test lamp provides an indication of circuit operation. The test lamp also operates as a modulation indicator during normal transmissions. The plastic panel of the control unit is edge-lighted by six subminiature lamps. All electrical connections to the control unit are made through a connector on the back of the unit.

In addition to the standard control unit (Part No. 37250-0000), two optional custom control units (Part No. 37250-2000 and 37250-3000) are available for special installations. The frequency selector switch assemblies, indicator, interconnection wiring, and connector are the same for all three

control units. The custom control units are supplied without the plastic front panel, panel lamp assembly, dust cover, and self-test toggle switch and test lamp which are normally mounted on the front panel. Wires are brought out from the assembly for connection to external switches (see Figure 6–9).

On custom control unit Part No. 37250-3000, on-off switches S6 and S7 and volume control resistor R4 are also deleted. Wires are brought out from the assembly for these external connections. Refer to the parts list in Section 7 for a description of suitable parts to perform the required functions of the deleted controls.

Mountings. Either Mounting 36450, a rigid mounting, or Mounting 36280, a vibration-isolated mounting, is used to secure the receiver-transmitter to the airframe. The accessory unit requires either Mounting 34980, a rigid mounting, or Mounting 36320, a vibration-isolated mounting. The units are secured by a nut-and-clamp arrangement on the front of the mountings. Flexible metal straps on the bottom of the 36280 and 36320 mountings are used to bond the unit and the mounting to the airframe.

SECTION 2

INSTALLATION

2–1. UNPACKING.

Remove all packing material from the packing case and carefully remove the units. Inspect each unit for damage. Check the units and accessories against the packing slip to be sure all items have been received and removed from the packing case.

2–2. PREINSTALLATION TESTS.

Before installation, the communication set should be bench-tested for overall performance. To bench-test the communication set, interconnect the units as shown in Figure 2–9, and proceed as follows:

Note

Equivalent test equipment may be substituted for any specified.

Step 1. Connect a Hewlett-Packard Model 608D Signal Generator through a Hewlett-Packard Model 00505B Attenuator to antenna connector J4 of the accessory unit. Set 608D for output of 2 μV at 126.00 MHz, with 30 percent modulation of 1 kHz.

Step 2. Connect Ballantine Model 300D vtvm to "phone out" (terminal P, J2) of receiver-transmitter.

Step 3. Apply power to the communication set.

Step 4. Select 126.00 MHz on control unit MHz and FRACT MHz controls.

Step 5. Adjust volume control on control unit for approximately 3.2 volts (10 dB) indication on 300D.

Step 6. Remove modulation from 608D. Model 300D should indicate a drop of at least 6 dB.

Step 7. Reconnect 300D across speaker.

Step 8. Readjust 608D for 10 μV signal with 30 percent modulation of 1 kHz. Model 300D should indicate at least 5 volts ac.

Step 9. Disconnect 608D, 00505B, and 300D.

Step 10. Connect a Bird Electronic Model 61 Wattmeter through a linear detector to antenna connector J4 of the accessory unit. Connect a Tektronix Model 310A Oscilloscope to side port of linear detector. Connect a Hewlett-Packard Model 200AB Audio Oscillator to "mike audio" input (terminal A, J1) of accessory unit.

Step 11. Adjust 200AB for output of 1000 Hz at 1 volt.

Step 12. Set control unit MHz and FRACT MHz controls to select 118.000, 126.500, and 135.975 MHz in succession. Key transmitter at each selected position. Model 61 should indicate a minimum of 16 watts and 310A should indicate at least 85 percent modulation for each frequency selected.

Step 13. Increase output of 200AB to 2.5 volts, and recheck transmitter output at 118.000, 126.500, and 135.975 MHz. Model 61 should indicate a minimum of 16 watts and 310A should indicate more than 85 percent but less than 100 percent modulation for each frequency selected.

Step 14. Disconnect 61, 310A, and 200AB.

2–3. INSTALLATION REQUIREMENTS.

The location and installation of the communication set may vary with each aircraft; however, the following general requirements are applicable to all aircraft.

a. Check that the proposed installation areas can accommodate the units. Refer to the installation dimensions in Figures 2–1 through 2–5 and Figures 2–7 and 2–8.

b. Install the units in an area where they will be accessible for inspection and maintenance but not subject to excessive heat, vibration, or noise generating sources. Install the control unit in an area convenient to the operator.

c. Allow at least 3 inches at the front of the receiver-transmitter and the accessory unit and 2 inches at the rear of the control unit to accommodate the electrical cables. Make no sharp bends in the wiring. Do not run cables where they may be subjected to chafing or excessively high temperatures.

d. To ensure proper antenna grounding, use internal- or external-tooth lockwashers under the head of each mounting screw and tighten screws securely, particularly if a weather seal is used.

e. Length of coaxial antenna cable is critical for proper self-test operation. Length of cable must be a multiple of 31 inches.

2–4. INSTALLATION OF RECEIVER-TRANSMITTER AND MOUNTING.

Installation dimensions for the receiver-transmitter installed on its mounting are shown in Figures 2–1 and 2–2. To install the receiver-transmitter and mounting, refer to Figure 2–1 or 2–2, as applicable, and proceed as follows:

Step 1. Use bottom plate of mounting as a template to locate mounting holes.

Step 2. Drill required number and size of holes in mounting surface. Remove paint and clean the surface around holes to ensure proper bonding.

Step 3. Secure mounting with binding head screws, lockwashers, and nuts.

Step 4. Place receiver-transmitter on mounting. Position clamp and tighten knurled nut to secure unit in position.

2–5. INSTALLATION OF ACCESSORY UNIT AND MOUNTING.

Installation dimensions for the accessory unit installed on its mounting are shown in Figures 2–3 and 2–4. To install the accessory unit and mounting, refer to Figure 2–3 or 2–4, as applicable, and proceed as follows:

Step 1. Use bottom plate of mounting as a template to locate mounting holes.

Step 2. Drill required number and size of holes in mounting surface. Remove paint and clean the surface around holes to ensure proper bonding.

Step 3. Secure mounting with binding head screws, lockwashers, and nuts.

Step 4. Place accessory unit on mounting. Position clamp and tighten knurled nut to secure unit in position.

2–6. INSTALLATION OF CONTROL UNIT.

The C-131A Control Unit is designed for mounting on a 1/16-inch-thick panel. Panels of other thicknesses require the use of the adapter plate supplied with the unit. Installation dimensions for the control unit are shown in Figure 2–5. Assembly details, with and without the adapter plate, are shown in Figure 2–6.

The optional control units, Part No. 37250-2000 and 37250-3000 (refer to paragraph 1–6, *Control Unit*), are designed for custom installation. Installation dimensions for the custom frequency control assembly are shown in Figure 2–5.

2–7. INSTALLATION OF ANTENNA.

Installation dimensions for the A-25D Antenna are shown in Figure 2–7. Installation dimensions for the A-29C Antenna are shown in Figure 2–8. In general, keep the antenna symmetrical with the centerline of the aircraft and locate it in an area as far removed as possible from other antennas, lead-in wires, and guy wires.

2–8. INTERCONNECTION OF UNITS.

An interconnection diagram for a 131B installation is shown in Figure 2–9. Terminate cables and wiring as shown.

2–9. POSTINSTALLATION CHECKS AND ADJUSTMENTS.

No postinstallation adjustments of the communication set are required, but a postinstallation check should be performed to verify its operation. Refer to the operating procedures in Section 3 for use of the self-test feature, and check the equipment by communicating with the base station or local communication facility on several channels.

The amplifier level control, A8R6, and the speaker and phone sidetone level controls, A8R3 and A8R5, are preset at the factory for an average output. After the postinstallation check has been performed, these controls may be reset if desired. See Figure 5–5 for the location of these controls.

The standing wave ratio of the antenna installation may be checked as follows:

Step 1. Connect the dc probe of a Hewlett-Packard Model 410B vtvm (or equivalent) to the red jack (A8J6) on the front of the accessory unit.

Step 2. Depress toggle switch A8S1 adjacent to red jack and note indication on vtvm. In a satisfactory installation, the 410B should indicate not more than 0.7 volt dc—the lower the indication the better.

2–10. USE OF 116- AND 117-MHZ CHANNELS.

To use the 116- and 117-MHz channels, remove the stop in the control unit as described in paragraph 5–3.

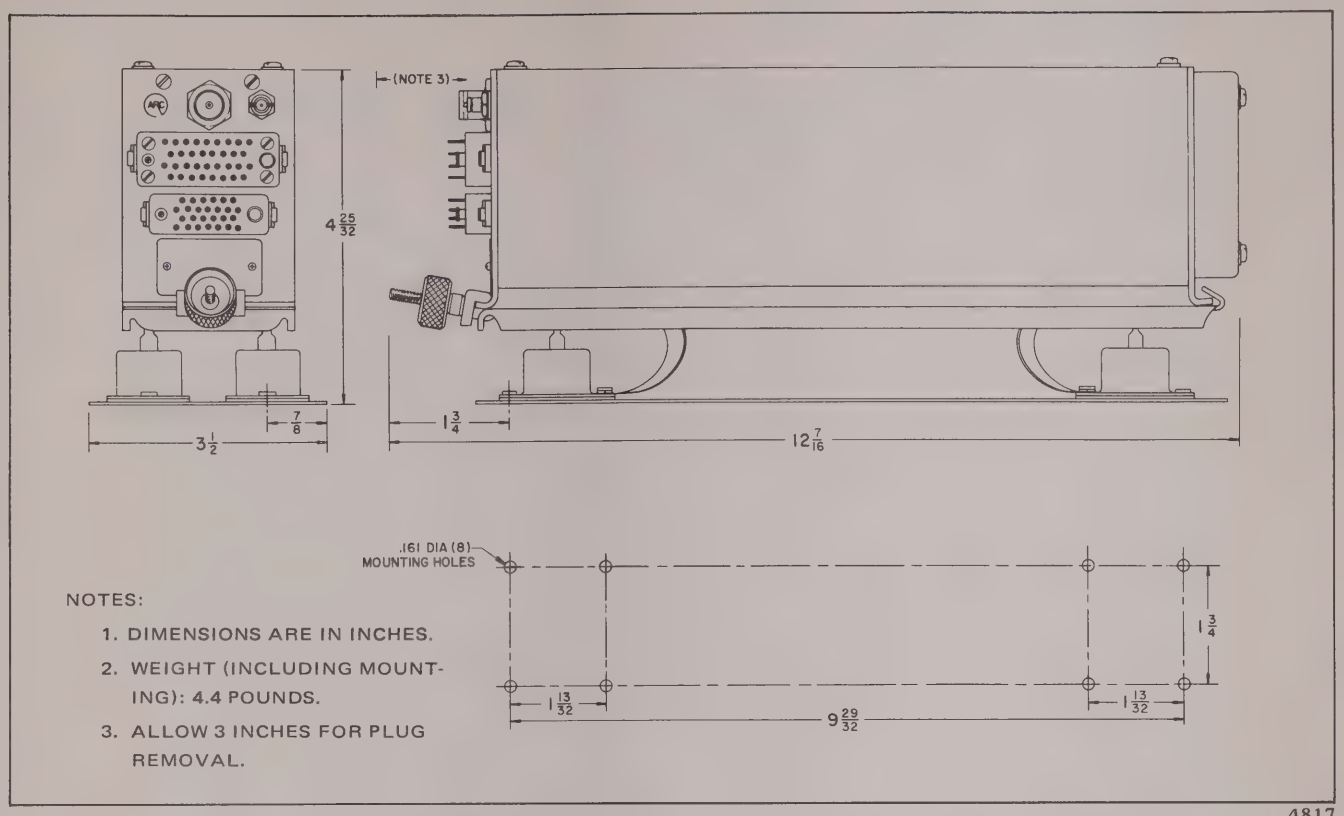


Figure 2–1. RT-131A Receiver-Transmitter with Mounting 36280, Installation Dimensions

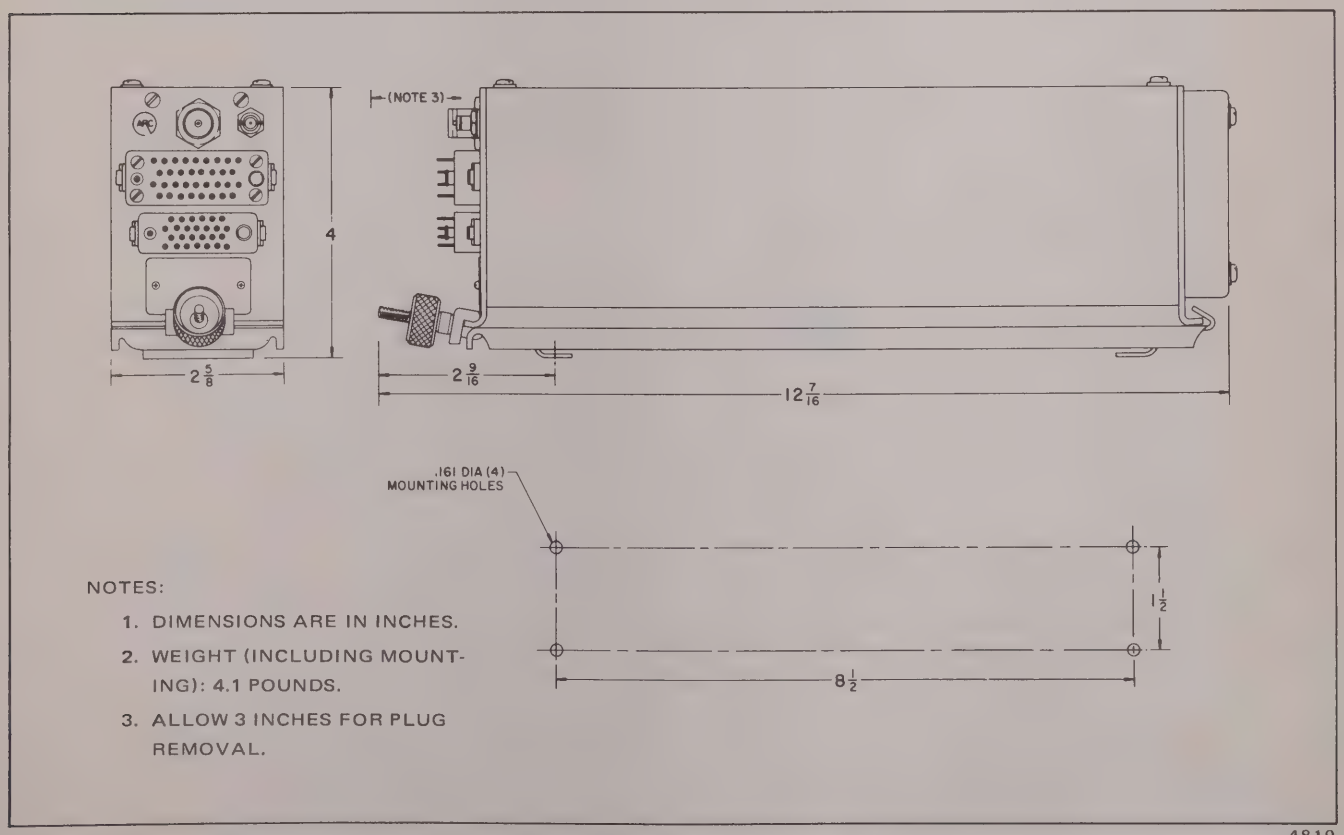
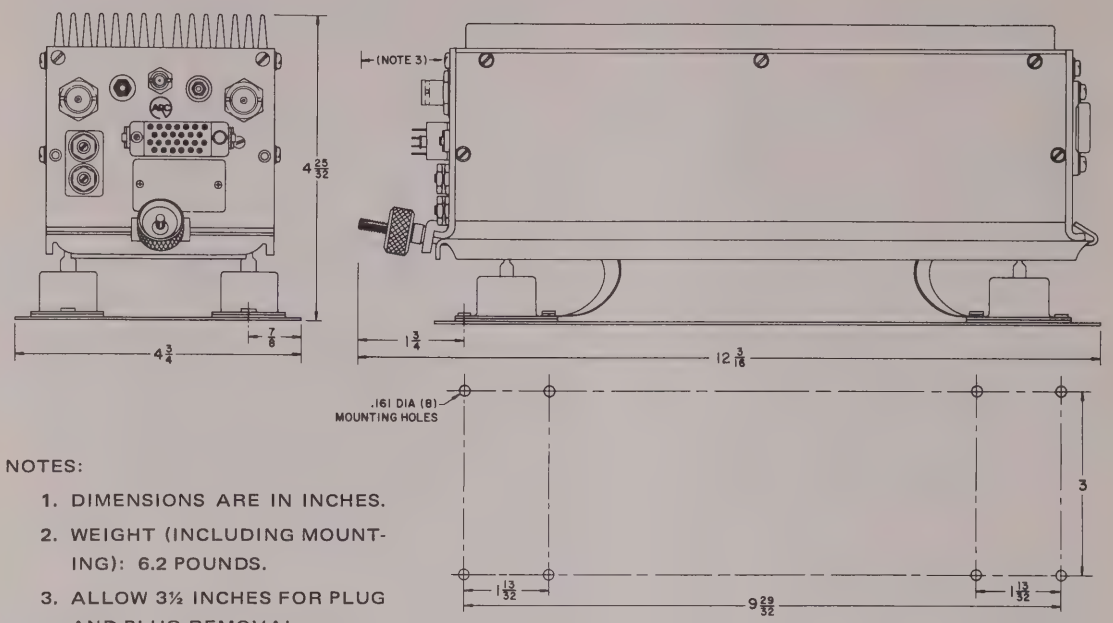


Figure 2–2. RT-131A Receiver-Transmitter with Mounting 36450, Installation Dimensions

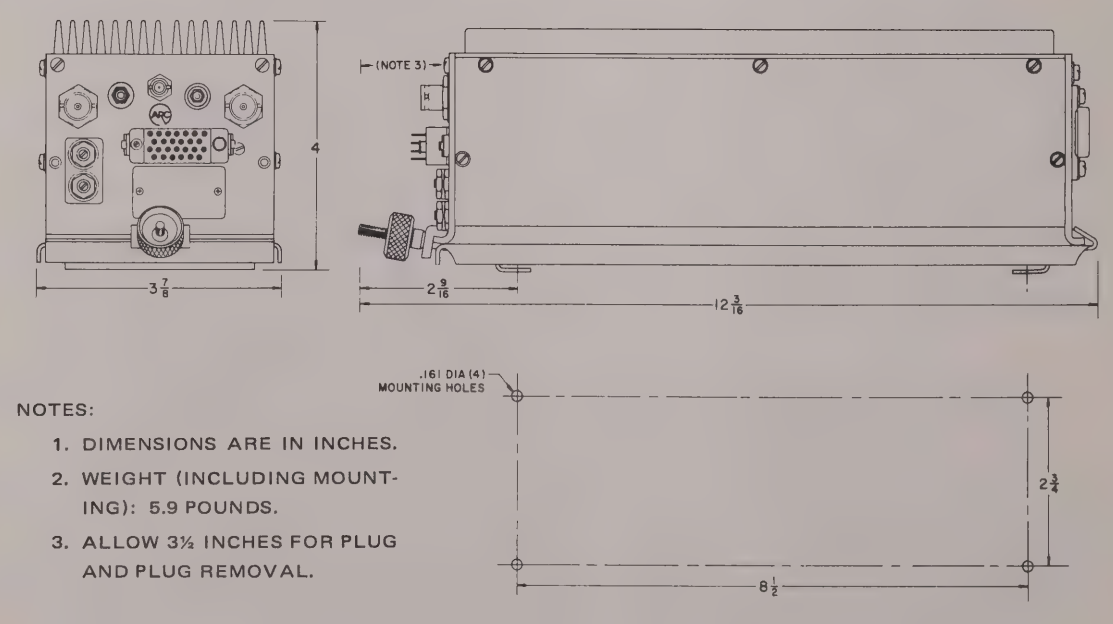


NOTES:

1. DIMENSIONS ARE IN INCHES.
2. WEIGHT (INCLUDING MOUNTING): 6.2 POUNDS.
3. ALLOW 3½ INCHES FOR PLUG AND PLUG REMOVAL.

4821A

Figure 2–3. RTA-131B Accessory Unit with Mounting 36320, Installation Dimensions

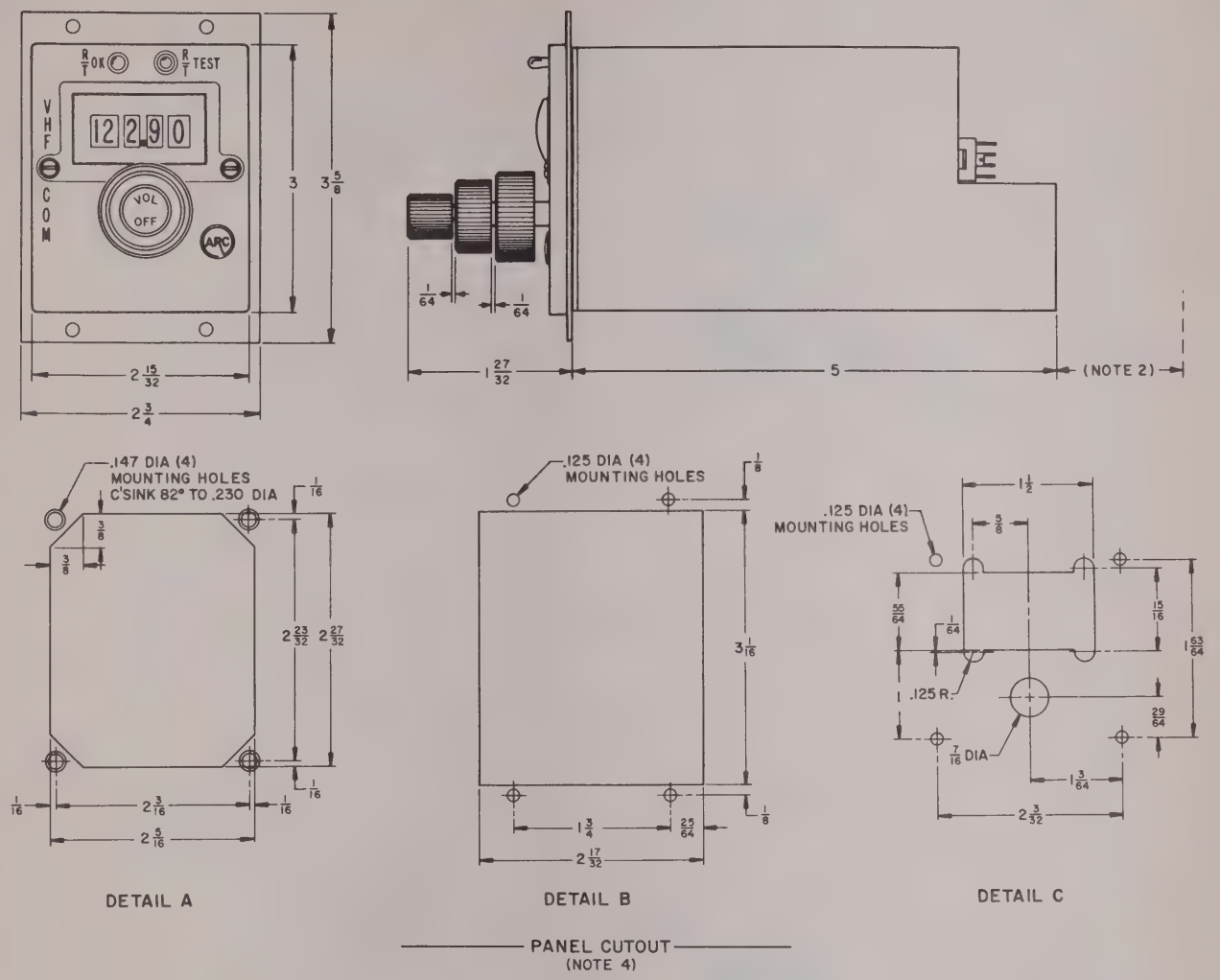


NOTES:

1. DIMENSIONS ARE IN INCHES.
2. WEIGHT (INCLUDING MOUNTING): 5.9 POUNDS.
3. ALLOW 3½ INCHES FOR PLUG AND PLUG REMOVAL.

4823A

Figure 2–4. RTA-131B Accessory Unit with Mounting 34980, Installation Dimensions

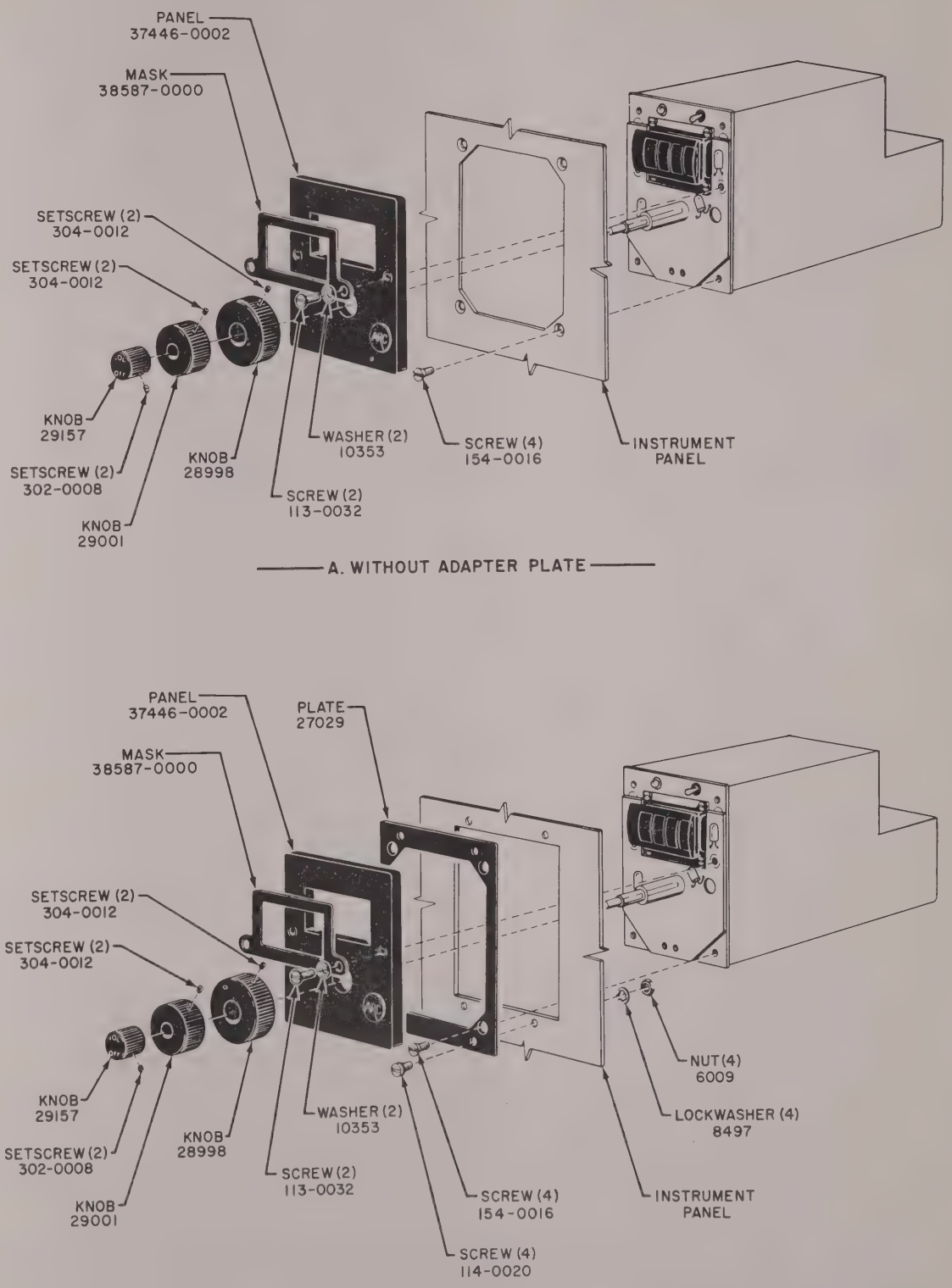


NOTES:

1. DIMENSIONS ARE IN INCHES.
2. ALLOW 3 INCHES FOR CABLE BEND.
3. WEIGHT: 1.4 POUNDS.
4. C-131A MOUNTS DIRECTLY ON 1/6 INCH INSTRUMENT PANEL. UNIT REQUIRES ADAPTER PLATE IF PANEL IS OF ANY OTHER THICKNESS. USE CUTOUT DIMENSIONS, DETAIL A, FOR DIRECT PANEL MOUNTING. USE CUTOUT DIMENSIONS, DETAIL B, FOR MOUNTING UNIT WITH ADAPTER PLATE. CUTOUT DIMENSIONS FOR MOUNTING CUSTOM CONTROL UNITS ARE SHOWN IN DETAIL C.

4825A

Figure 2–5. C-131A Control Unit, Installation Dimensions

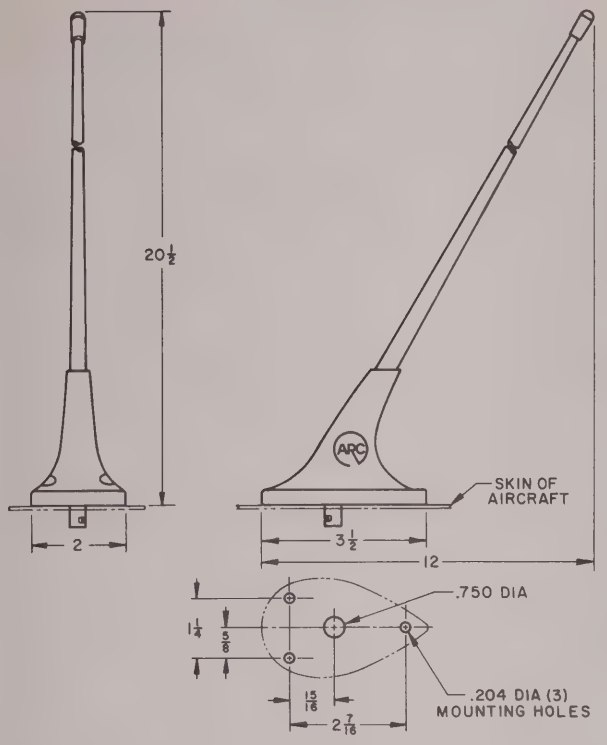


4843A

Figure 2–6. C-131A Control Unit, Assembly Details

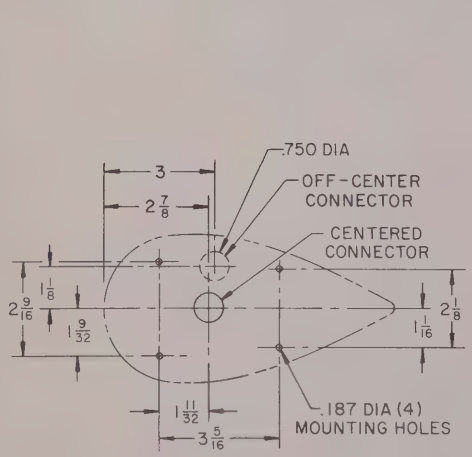
NOTES:

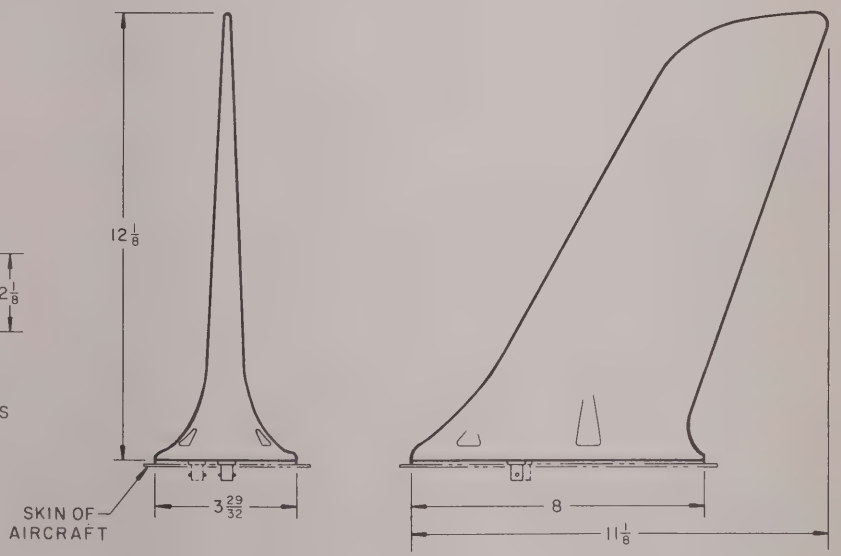
1. DIMENSIONS ARE IN INCHES.
2. WEIGHT: 0.5 POUND.



3241A

Figure 2–7. A-25D Antenna, Installation Dimensions



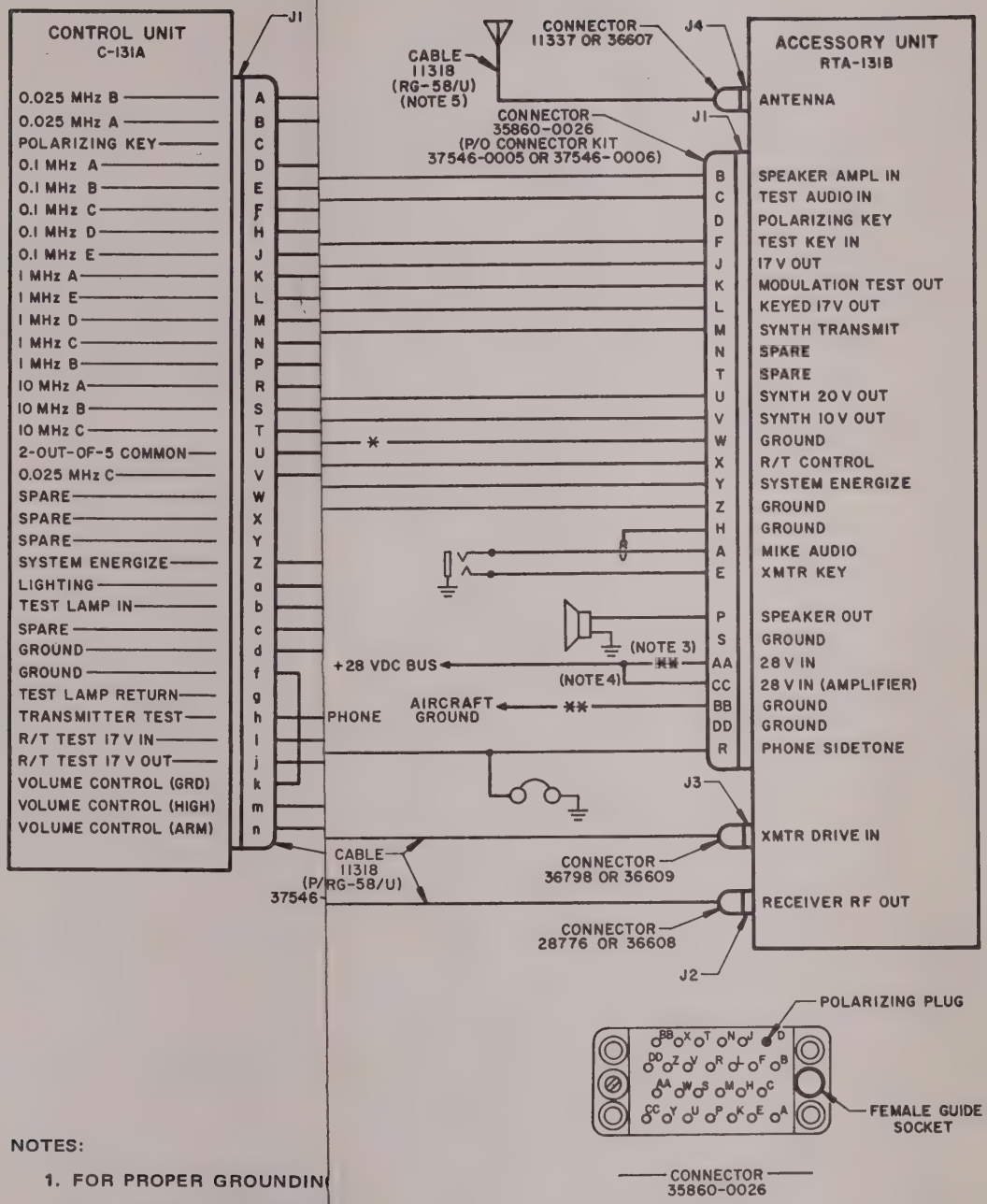


NOTES:

1. DIMENSIONS ARE IN INCHES.
2. WEIGHT: 1.4 POUNDS.

4829

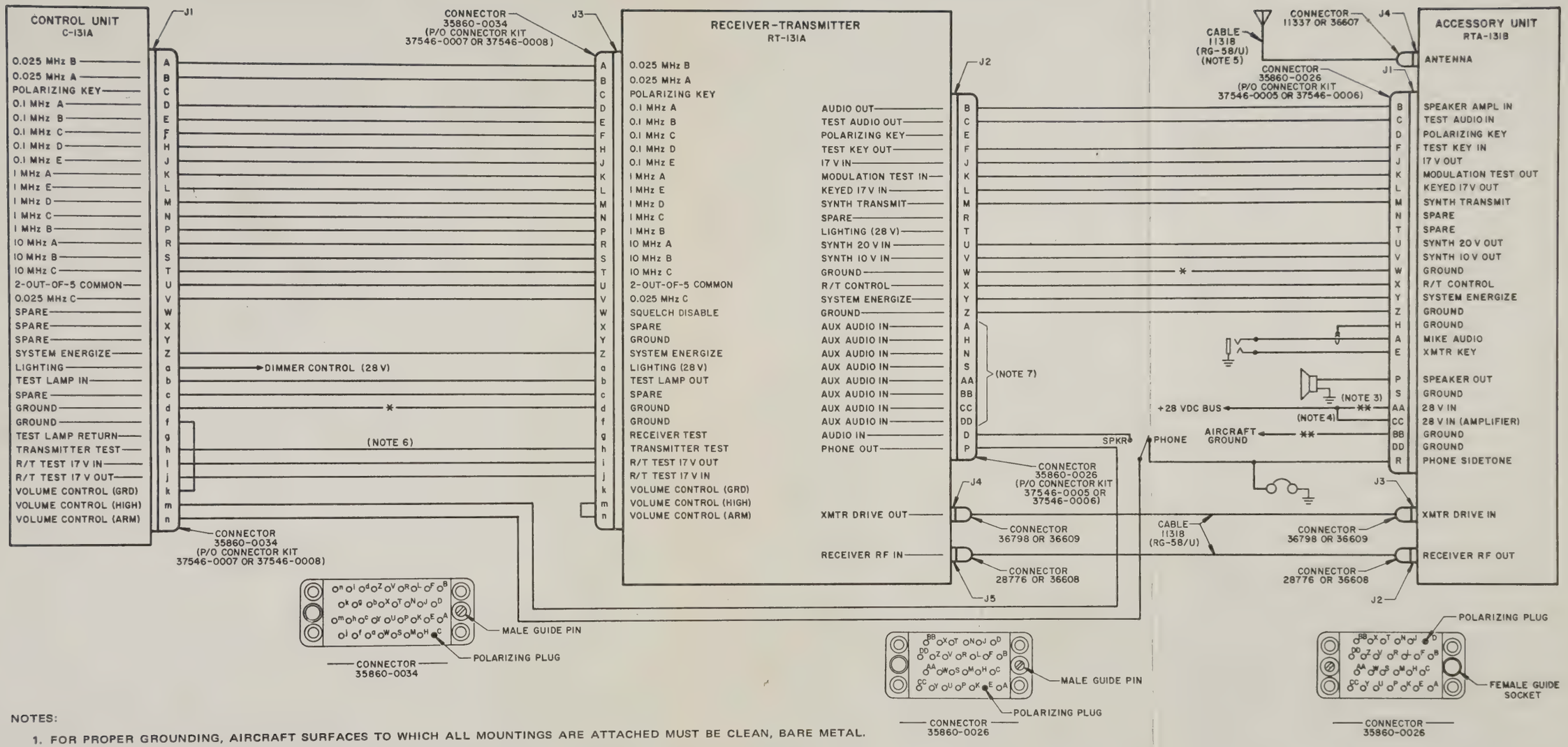
Figure 2–8. A-29C Antenna, Installation Dimensions



NOTES:

1. FOR PROPER GROUNDIN
2. ALL WIRES ARE STRANDE
   WIRES MARKED WITH A D
3. CONNECT TO 28-V SOURC
4. FOR CONTROL OF SPEAK
   FOR INDEPENDENT CONT
   BREAKER.
5. LENGTH OF ANTENNA CA
6. CONTROL UNIT "TRANSM
   CUIT INSTEAD OF THROU
7. AUDIO OUTPUTS FROM O
   TO THE AUXILIARY AUDI

Figure 2–9. 131B Communication Set, Interconnection Diagram



NOTES:

1. FOR PROPER GROUNDING, AIRCRAFT SURFACES TO WHICH ALL MOUNTINGS ARE ATTACHED MUST BE CLEAN, BARE METAL.
2. ALL WIRES ARE STRANDED COPPER. UNMARKED WIRES ARE NO. 22 AWG. WIRES MARKED WITH AN ASTERISK (*) ARE NO. 18 AWG. WIRES MARKED WITH A DOUBLE ASTERISK (**) ARE NO. 16 AWG. SHIELDED WIRES ARE NO. 22 AWG WITH INSULATING JACKET.
3. CONNECT TO 28-V SOURCE THROUGH 10-AMPERE CIRCUIT BREAKER.
4. FOR CONTROL OF SPEAKER AMPLIFIER THROUGH C-131A ON-OFF SWITCH, CONNECT JUMPER BETWEEN AA AND CC AS SHOWN. FOR INDEPENDENT CONTROL OF AMPLIFIER, DELETE JUMPER AND CONNECT CC TO 28-V SOURCE THROUGH A 5-AMPERE CIRCUIT BREAKER.
5. LENGTH OF ANTENNA CABLE MUST BE 31 INCHES, OR ANY MULTIPLE OF 31 INCHES.
6. CONTROL UNIT "TRANSMITTER TEST" LEAD (TERMINAL "h", J1) MAY BE CONNECTED DIRECTLY TO MICROPHONE KEYING CIRCUIT INSTEAD OF THROUGH RECEIVER-TRANSMITTER AND ACCESSORY UNIT, AS SHOWN.
7. AUDIO OUTPUTS FROM OTHER EQUIPMENTS MAY BE CONNECTED THROUGH INDIVIDUAL SPDT SWITCHES TO THE HEADSET AND TO THE AUXILIARY AUDIO INPUTS FOR SPEAKER OUTPUT.

4831

Figure 2–9. 131B Communication Set, Interconnection Diagram

SECTION 3

OPERATION

3–1. OPERATING CONTROLS.

Operating controls for the 131B Communication Set are located on the control unit (see Figure 3–1). The functions of these controls are described in Table 3–1.

Note

The MHz and FRACT MHz designations are not marked on the control unit.

TABLE 3–1. OPERATING CONTROLS AND INDICATOR

Designation	Control or Indicator	Function
VOL-OFF	Primary Power and Receiver Volume Control	Combined primary power and volume control. Clockwise rotation applies power. Further clockwise rotation increases audio level.
MHz	Receiver-Transmitter Megahertz Selector	Selects receiver-transmitter frequency in 1-MHz steps between 118 and 135 MHz.[1]
FRACT MHz	Receiver-Transmitter Fractional Megahertz Selector	Selects receiver-transmitter frequency in .025-MHz steps between .00 and .975 MHz.
R/T TEST	Receiver or Transmitter Self-Test Selector	Selects self-test function of receiver or transmitter.
R/T OK	Self-Test Indicator and Transmitter Modulation Indicator	When R/T TEST selector is held at R or T, indicates proper operation when light glows steadily; indicates receiver or transmitter malfunction when light flashes. During normal transmission, lamp lights with voice modulation.

[1] When stop is removed, selects receiver-transmitter frequency in 1-MHz steps between 116 and 135 MHz.

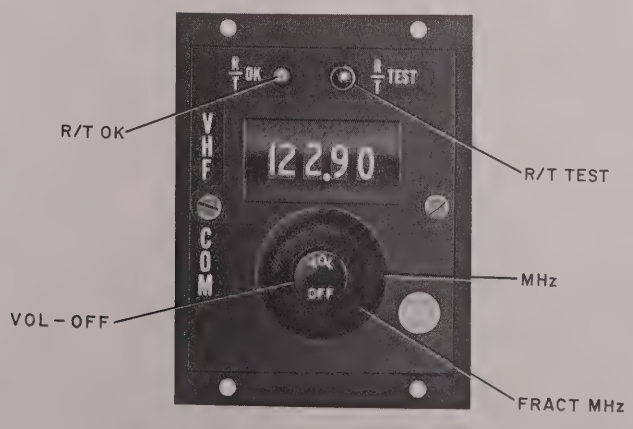


Figure 3–1. 131B Communication Set, Operating Controls and Indicator

1778

3–2. COMMUNICATION OPERATING PROCEDURES.

For communication operation, proceed as follows:

Step 1. Turn VOL-OFF control clockwise to apply power.

Step 2. Rotate MHz and FRACT MHz controls to select desired frequency.

Step 3. Adjust VOL-OFF control for comfortable audio level.

Step 4. To transmit, depress microphone button to key transmitter and speak into microphone. When the transmitter is modulated properly, R/T OK lamp should light.

Step 5. To receive, release microphone button.

3–3. SELF-TEST OPERATING PROCEDURES.

For self-test operation of the receiver or the transmitter, proceed as follows:

Step 1. Turn VOL-OFF control clockwise to apply power.

Step 2. To test transmitter, hold R/T TEST switch in "T" position. When the transmitter is functioning normally, R/T OK lamp will light and glow steadily. When a malfunction is present in the transmitter circuit, R/T OK lamp will flash intermittently.

Step 3. To test receiver, hold R/T TEST switch in "R" position. When receiver is functioning normally, R/T OK lamp will glow steadily, and audio tone (of approximately 1000 Hz) will be heard on headset or speaker. When a malfunction is present in the receiver, R/T OK lamp will flash intermittently, and no audio tone will be heard.

Step 4. Release R/T TEST switch for normal communication operation.

SECTION 4

PRINCIPLES OF OPERATION

4–1. INTRODUCTION.

This section describes the principles of operation of the 131B Communication Set. The circuits of the receiver-transmitter are illustrated in Figure 6–1, those of the accessory unit in Figure 6–4, and those of the control unit in Figure 6–7. Schematic diagrams of some microcircuit assemblies are included in this section to supplement the circuit descriptions.

4–2. OVERALL FUNCTIONAL DESCRIPTION.

Power Distribution. As shown in Figure 4–1, four regulator circuits in the accessory unit are used to convert the 27.5-volt input from the aircraft bus into voltages required for operation of the 131B. The 27.5-volt input is coupled through A8J1 to the input of the power switch in assembly A7, through fuse A5F1 to the 20-volt regulator in A5, and through fuse A5F2 and a-c filter A8R1 and A8C1 to the power amplifier in A6. When the on-off switch on the control unit is closed, the power switch and the transient protector in A7 are energized. The 27-volt output from the power switch is applied to the 17-volt regulator in A5, to relay delay A4A2, and to the normally-open contacts of keying relay A8K2. When the transmitter keying switch is closed, 27 volts through A8K2 is applied to the 15-volt regulator in A7. The regulated 15 volts is applied directly to A1 and to the low side of the modulator winding in A6. The modulated supply current is applied to transmitter amplifier A1 at a 14-volt potential after a 1-volt drop through the resistance of the modulator winding. If a short circuit occurs in any of the 27-volt load circuits, power switch A7Q1 is turned off for as long as the short circuit persists. When the short circuit is removed, power switch A7Q1 may be reactivated by turning the power switch on the control unit off and then on.

The 20-volt output from the 20-volt regulator in A5 is distributed to modulator-amplifier A6 and signal sensor A4A1 in the accessory unit, and to frequency synthesizer A4 in the receiver-transmitter. The 17-volt output from the regulator in A5 is distributed to keying relay A8K2, through A8F1 and A8R7 to provide a 10-volt source for the receiver-transmitter, to the 15-volt switch in A3 of the receiver-transmitter, and to the R/T TEST switch in the control unit. When the transmitter keying switch is closed, a keyed 17 volts from A8K2 is applied to the self-test audio circuit in A7 and to the flasher circuit in A3 of the receiver-transmitter.

In the receiver-transmitter, the 10-volt signal from the accessory unit is applied to the 5-volt regulator in assembly A3 to produce a 5-volt input for frequency synthesizer A4. The 17-volt signal from the accessory unit is applied to the 15-volt switch in A3 and to audio amplifier A2A7. From the receiver-transmitter, the 17-volt signal is coupled to the R/T TEST switch in the control unit to supply the self-test circuits as selected. The 15-volt output from the 15-volt switch circuit in A3 is applied to the receiver circuits in assemblies A1 and A2.

Receiver Circuits. (See Figure 4–2.) When a communication frequency is selected on the control unit, the signal picked up by the antenna (116.000–135.975 MHz) is fed through the normally-closed contacts of antenna relay A8K1 in the accessory unit and through bandpass filter A3 to the receiver r-f input of the receiver-transmitter. In the receiver-transmitter, the r-f signal is amplified in an r-f amplifier stage (A1A2) and mixed with the selected local oscillator signal (139.025–159.000 MHz) from the frequency synthesizer (A4) in a balanced mixer circuit (A1A3). The resulting first i-f frequency (23.025 MHz) is filtered in a crystal filter (A2Z1) and amplified in a first i-f amplifier stage (A2A1) before it is applied to the second mixer (A2A2). The second mixer also receives the output from a 27.245-MHz crystal-controlled oscillator (also part of A2A2). The two signals are heterodyned to produce the second i-f frequency (4.22 MHz). This signal is amplified in a second i-f amplifier (A2A3) and detected for the d-c and audio components.

The detected audio signal is applied to the noise amplifier in the squelch circuit (A2A6). The combined d-c and audio detected signal is applied to a d-c amplifier, to an agc amplifier, and to a noise limiter circuit (all part of A2A4). The amplified noise signal and the amplified d-c signal (from A2A4) are applied to a Schmitt trigger circuit in A2A6 for comparison. The audio signal after passing through the noise limiter in A2A4 is leveled in an audio compressor (A2A5) and is applied to the squelch diode switch in A2A6. When the amplified carrier d-c signal exceeds the rectified

noise voltage, the squelch gate triggers and the audio signal is connected through the squelch switching diode in A2A6 to the audio amplifier circuit (A2A7) for amplification. When the noise level is high enough to inhibit the predetermined minimum carrier-to-noise ratio, the squelch gate will not trigger, the squelch diode switch will remain open, and the audio signal will not be heard.

The agc signal developed in the agc amplifier circuit of A2A4 is returned to the r-f amplifier circuit and to the two i-f amplifier circuits to maintain a constant signal level. The receiver audio signal from A2A7 is applied through the volume control on the control unit and through an external speaker-phone switch to the headset or to the modulator-amplifier circuits in the accessory unit for amplification to drive the cabin speaker.

When a receiver self-test signal (R) is selected on the control unit R/T TEST switch, a 17-volt signal from the switch is applied to self-test assembly A1A1 and to the flasher circuit of regulator assembly A3 in the receiver-transmitter. In the self-test assembly, a crystal oscillator generates a 23.025-MHz signal which is heterodyned with the selected local oscillator signal (139.025–159.000 MHz) from frequency synthesizer A4 to produce an input signal (116.000–135.975 MHz) for the receiver circuit. An audio signal from an audio oscillator in A1A1 modulates the receiver input signal. Operation of the receiver circuits is as previously described. A portion of the amplified d-c component of the detected signal from A2A4 is applied to the energized flasher circuit in A3. When the receiver circuits are functioning properly, a steady signal from the flasher circuit causes the R/T OK lamp on the control unit to glow steadily; also, a 1000-Hz audio tone is heard in the headset. When a malfunction is present in any of the receiver circuits, the amplified d-c signal from A2A4 is below the required output necessary to disable the squelch or to cause the flasher circuit to generate a steady signal, and the flasher circuit applies an intermittent signal to the R/T OK lamp which glows intermittently.

Transmitter Circuits. (See Figure 4–3.) When the transmitter keying switch is closed, a ground return signal is applied to the coil of antenna relay A8K1, causing 27 volts through relay delay circuit A4A2 to energize the relay. The communication antenna is then connected through the normally-open contacts of A8K1 to the output of the transmitter circuit. After a delay of approximately 20 milliseconds, a signal from the signal delay circuit also energizes keying relay A8K2. This delay prevents keying of the transmitter without a load. The 14-volt regulator in transient protector power switch A7 is energized through A8K2 to supply the operating voltage to the transmitter, and a disable signal from A8K2 is applied to the 15-volt switch circuit in the receiver-transmitter to turn off the receiver circuits for the duration of the keyed condition. A keying signal from A8K2 is applied to frequency synthesizer A4 in the receiver-transmitter to switch the frequency synthesizer to the transmit function. The frequency synthesizer produces the selected low-voltage r-f signal (116.000–135.975 MHz) which is applied to the transmitter circuits in the accessory unit.

In transmitter amplifier assembly A1, the r-f signal from the frequency synthesizer is amplified in first and second r-f amplifiers A1Q1 and A1Q2, predriver and driver amplifiers A1Q3 and A1Q4, and power amplifiers A1Q5 and A1Q6. The two power amplifiers are connected in push-pull so that each transistor is required to handle only one-half of the output power (about 20 watts).

A signal from the transmitter keying switch is also applied to the audio switch circuit (A6A2) of the accessory unit to switch the modulator-amplifier to the modulator function. The microphone audio input signal is applied to the audio limiter circuit (A6A1) and through the energized audio switch (A6A2) to the audio amplifier circuits in A6A3 and A6Q1 and A6Q2 for power amplification. A modulated 14-volt signal from A6 is applied to all of the transmitter amplifier stages in A1 to modulate the transmitter output signal.

The modulated output signal from the transmitter (116.000–135.975 MHz) is applied through harmonic filter and SWR detector A2, through energized antenna relay A8K1, to the communication antenna. A sample of the transmitter output signal from the SWR detector in A2 is examined in the signal sensor (A4A2) and applied through the flasher circuit in A3 of the receiver-transmitter to the R/T OK lamp on the control unit to provide a modulation indicator. In the event that the antenna circuit presents an improper load to the transmitter circuit, a reverse signal developed in the SWR detector is applied to SCR gate A7CR5 to turn off the 14-volt regulator circuit in A7 and the transmitter supply voltage for as long as the improper loading condition persists.

When a transmitter self-test (T) signal is selected on the control unit R/T TEST switch, a keying signal is applied to antenna relay A8K1 and to relay delay A4A2 to activate the transmitter circuits. A 17-volt signal from the R/T TEST switch is applied to self-test assembly A1A1 and the flasher circuit in A3 of the receiver-transmitter. A keyed 17-volt signal from A8K2 and the test audio from the receiver-transmitter are applied to a comparison circuit in A7. The operation of the transmitter amplifier circuits is as previously described. The signal sensor A4A1 amplifies the output of the comparison circuit and supplies a d-c output to the flasher circuit in the receiver-transmitter. When the transmitter circuits are functioning normally, the signal sensor supplies a d-c output to the flasher circuit which exceeds a predetermined level. The flasher circuit then supplies a steady signal and the lamp lights and glows steadily. When a malfunction is present in a transmitter circuit, the d-c signal from the signal sensor is not sufficient to cause the flasher to supply a steady signal. The flasher then supplies an intermittent signal to the R/T OK lamp, causing the lamp to "blink".

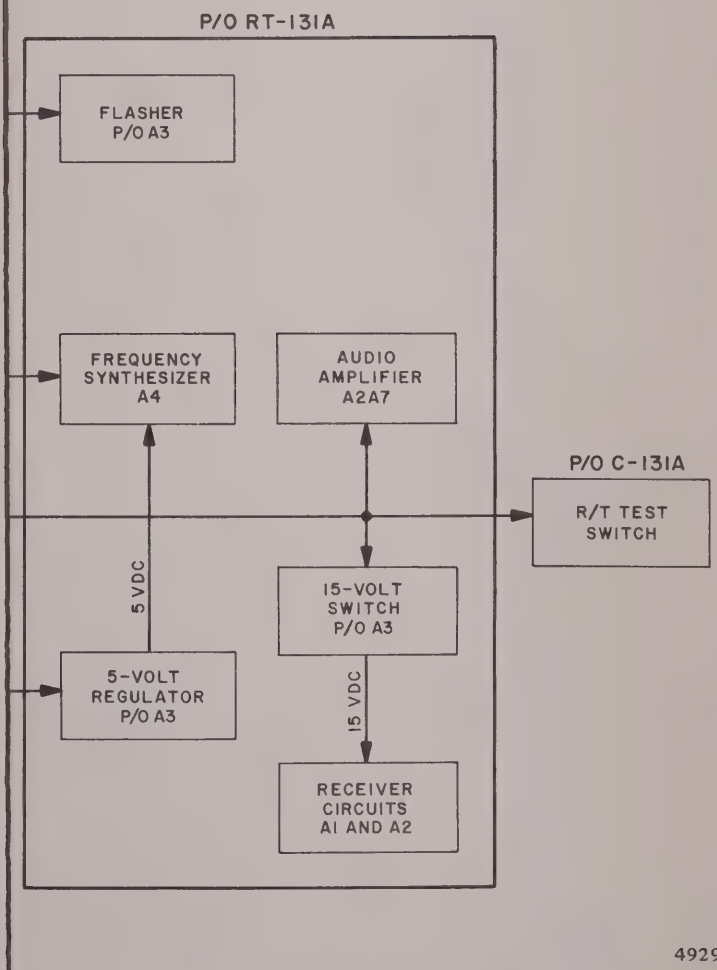


Figure 4–1. 131B Communication Set, Power Distribution Block Diagram

noise voltage, the squelch gate triggers and the audio signal is connected through the squelch switching diode in A2A6 to the audio amplifier circuit (A2A7) for amplification. When the noise level is high enough to inhibit the predetermined minimum carrier-to-noise ratio, the squelch gate will not trigger, the squelch diode switch will remain open, and the audio signal will not be heard.

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When a receiver self-test signal (R) is selected on the control unit R/T TEST switch, a 17-volt signal from the switch is applied to self-test assembly A1A1 and to the flasher circuit of regulator assembly A3 in the receiver-transmitter. In the self-test assembly, a crystal oscillator generates a 23.025-MHz signal which is heterodyned with the selected local oscillator signal (139.025–159.000 MHz) from frequency synthesizer A4 to produce an input signal (116.000–135.975 MHz) for the receiver circuit. An audio signal from an audio oscillator in A1A1 modulates the receiver input signal. Operation of the receiver circuits is as previously described. A portion of the amplified d-c component of the detected signal from A2A4 is applied to the energized flasher circuit in A3. When the receiver circuits are functioning properly, a steady signal from the flasher circuit causes the R/T OK lamp on the control unit to glow steadily; also, a 1000-Hz audio tone is heard in the headset. When a malfunction is present in any of the receiver circuits, the amplified d-c signal from A2A4 is below the required output necessary to disable the squelch or to cause the flasher circuit to generate a steady signal, and the flasher circuit applies an intermittent signal to the R/T OK lamp which glows intermittently.

Transmitter Circuits. (See Figure 4–3.) When the transmitter keying switch is closed, a ground return signal is applied to the coil of antenna relay A8K1, causing 27 volts through relay delay circuit A4A2 to energize the relay. The communication antenna is then connected through the normally-open contacts of A8K1 to the output of the transmitter circuit. After a delay of approximately 20 milliseconds, a signal from the signal delay circuit also energizes keying relay A8K2. This delay prevents keying of the transmitter without a load. The 14-volt regulator in transient protector power switch A7 is energized through A8K2 to supply the operating voltage to the transmitter, and a disable signal from A8K2 is applied to the 15-volt switch circuit in the receiver-transmitter to turn off the receiver circuits for the duration of the keyed condition. A keying signal from A8K2 is applied to frequency synthesizer A4 in the receiver-transmitter to switch the frequency synthesizer to the transmit function. The frequency synthesizer produces the selected low-voltage r-f signal (116.000–135.975 MHz) which is applied to the transmitter circuits in the accessory unit.

In transmitter amplifier assembly A1, the r-f signal from the frequency synthesizer is amplified in first and second r-f amplifiers A1Q1 and A1Q2, predriver and driver amplifiers A1Q3 and A1Q4, and power amplifiers A1Q5 and A1Q6. The two power amplifiers are connected in push-pull so that each transistor is required to handle only one-half of the output power (about 20 watts).

A signal from the transmitter keying switch is also applied to the audio switch circuit (A6A2) of the accessory unit to switch the modulator-amplifier to the modulator function. The microphone audio input signal is applied to the audio limiter circuit (A6A1) and through the energized audio switch (A6A2) to the audio amplifier circuits in A6A3 and A6Q1 and A6Q2 for power amplification. A modulated 14-volt signal from A6 is applied to all of the transmitter amplifier stages in A1 to modulate the transmitter output signal.

The modulated output signal from the transmitter (116.000–135.975 MHz) is applied through harmonic filter and SWR detector A2, through energized antenna relay A8K1, to the communication antenna. A sample of the transmitter output signal from the SWR detector in A2 is examined in the signal sensor (A4A2) and applied through the flasher circuit in A3 of the receiver-transmitter to the R/T OK lamp on the control unit to provide a modulation indicator. In the event that the antenna circuit presents an improper load to the transmitter circuit, a reverse signal developed in the SWR detector is applied to SCR gate A7CR5 to turn off the 14-volt regulator circuit in A7 and the transmitter supply voltage for as long as the improper loading condition persists.

When a transmitter self-test (T) signal is selected on the control unit R/T TEST switch, a keying signal is applied to antenna relay A8K1 and to relay delay A4A2 to activate the transmitter circuits. A 17-volt signal from the R/T TEST switch is applied to self-test assembly A1A1 and the flasher circuit in A3 of the receiver-transmitter. A keyed 17-volt signal from A8K2 and the test audio from the receiver-transmitter are applied to a comparison circuit in A7. The operation of the transmitter amplifier circuits is as previously described. The signal sensor A4A1 amplifies the output of the comparison circuit and supplies a d-c output to the flasher circuit in the receiver-transmitter. When the transmitter circuits are functioning normally, the signal sensor supplies a d-c output to the flasher circuit which exceeds a predetermined level. The flasher circuit then supplies a steady signal and the lamp lights and glows steadily. When a malfunction is present in a transmitter circuit, the d-c signal from the signal sensor is not sufficient to cause the flasher to supply a steady signal. The flasher then supplies an intermittent signal to the R/T OK lamp, causing the lamp to "blink".

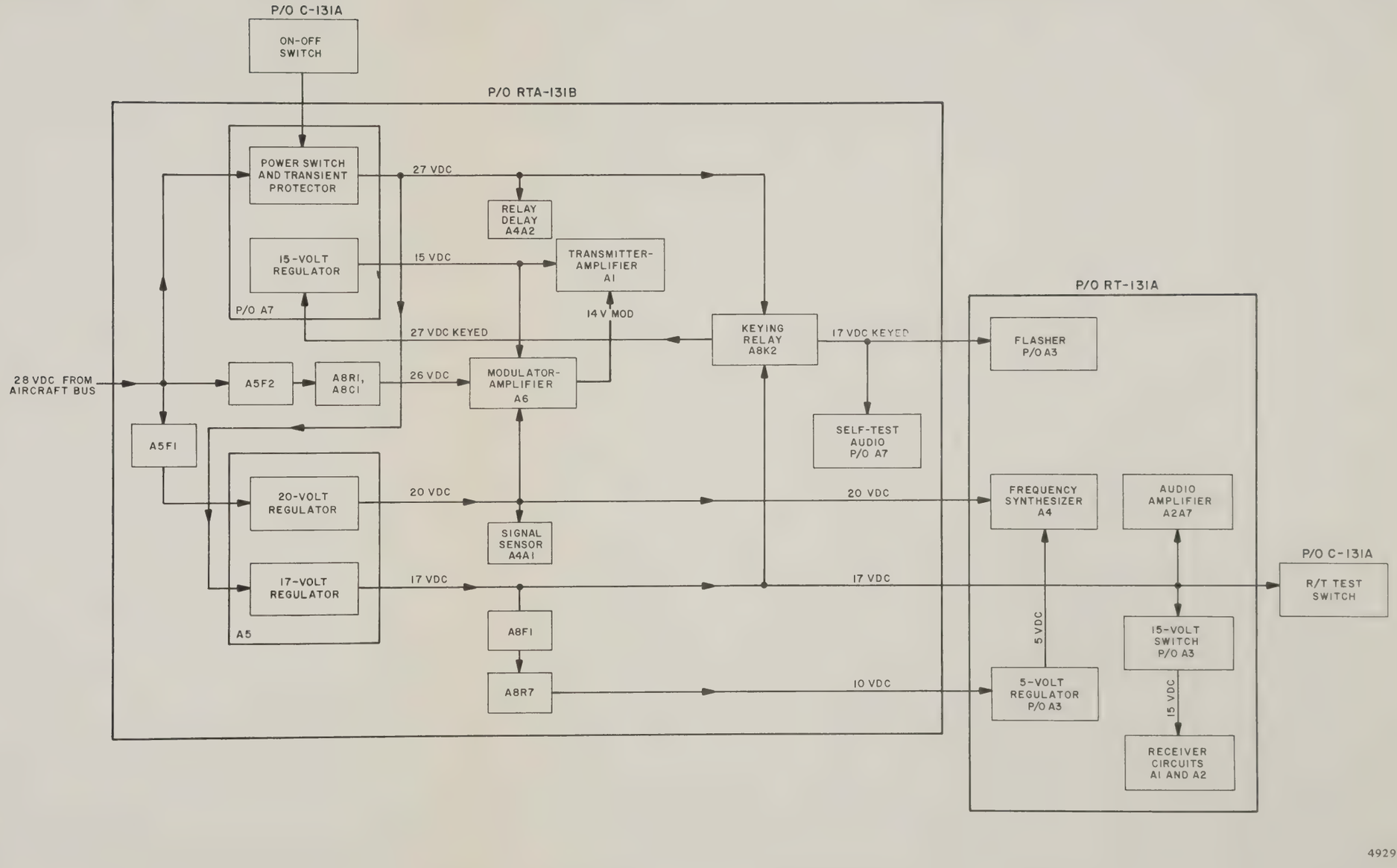

Figure 4–1. 131B Communication Set, Power Distribution Block Diagram

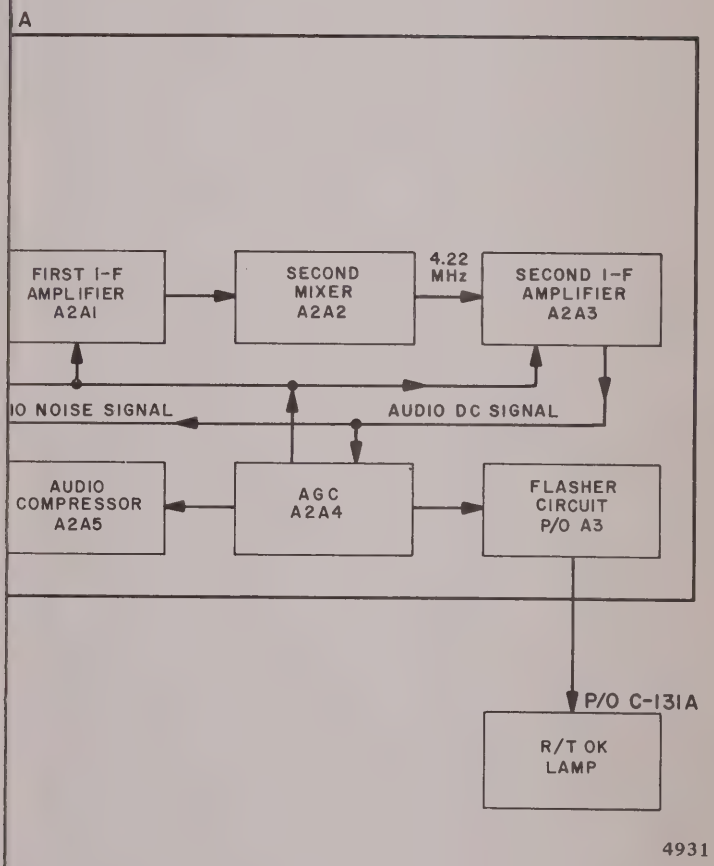

Figure 4–2. 131B Communication Set, Receiver Circuits Block Diagram

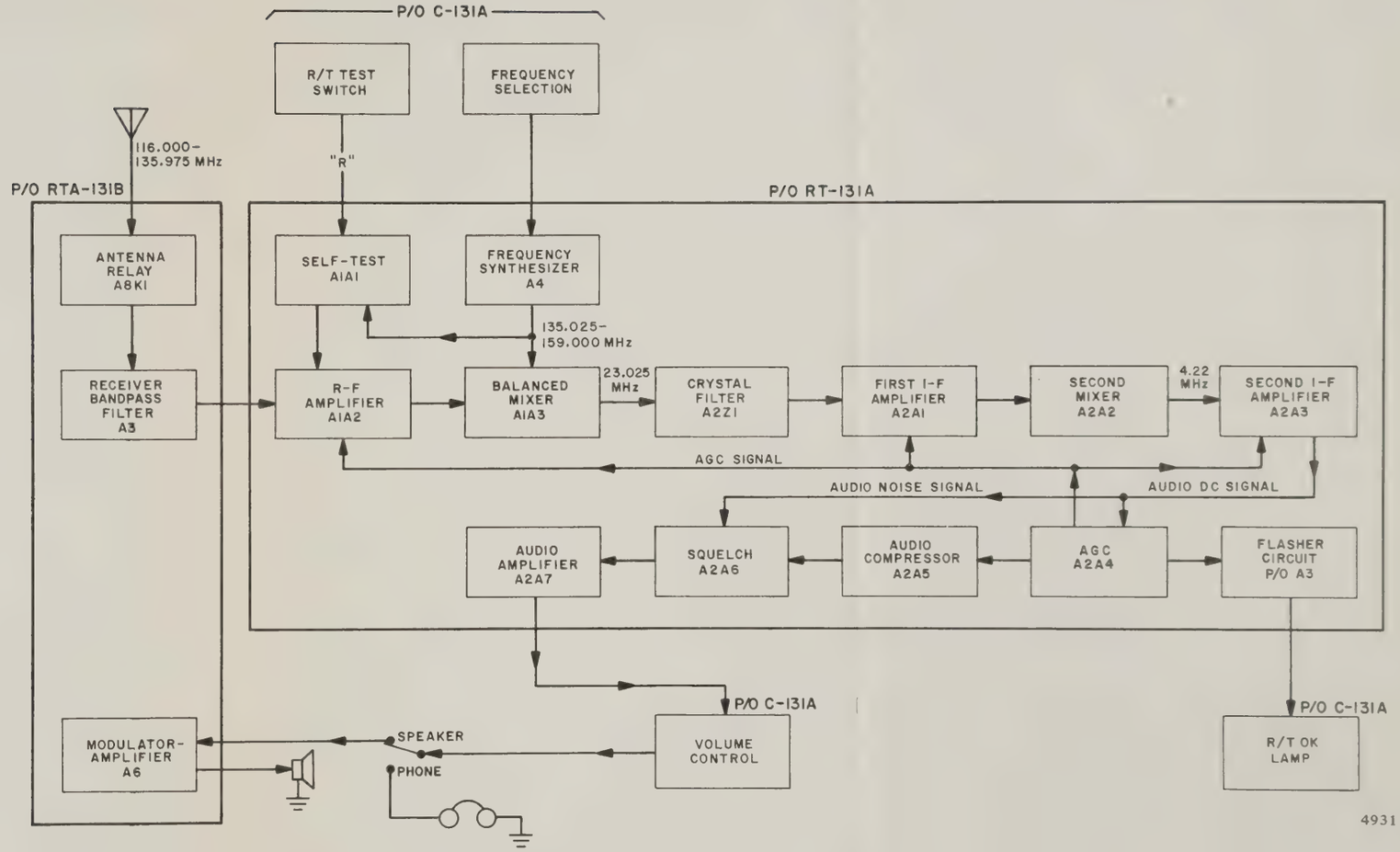

Figure 4–2. 131B Communication Set, Receiver Circuits Block Diagram

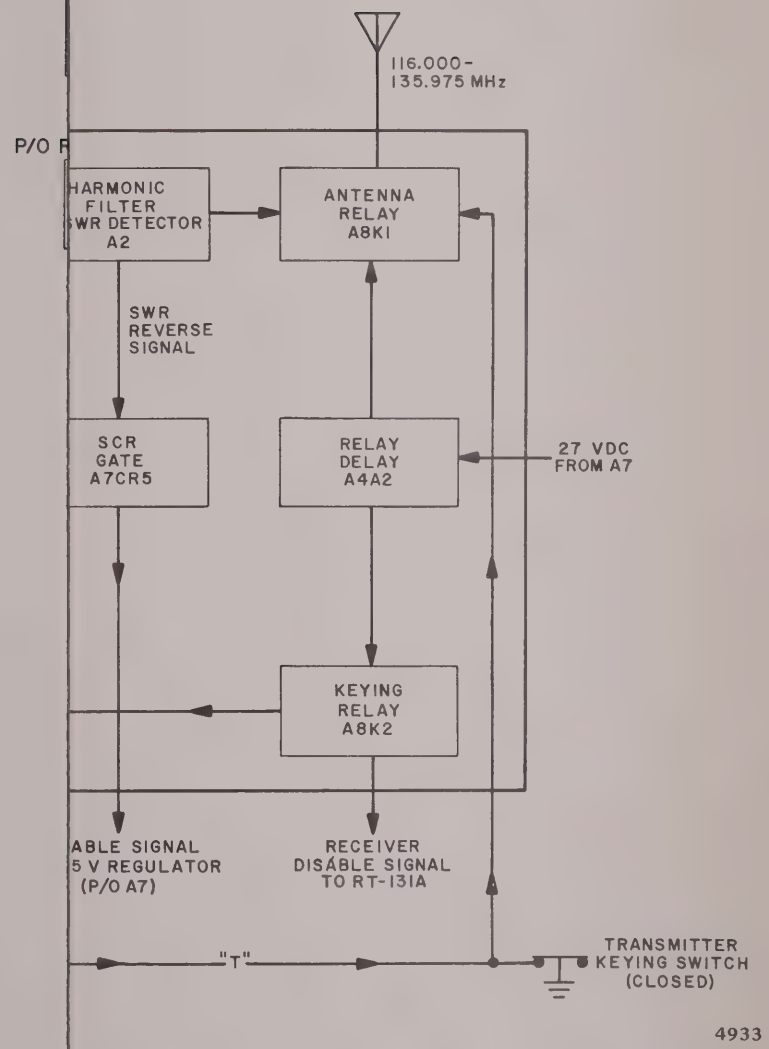

Figure 4–3. 131B Communication Set, Transmitter Circuits Block Diagram

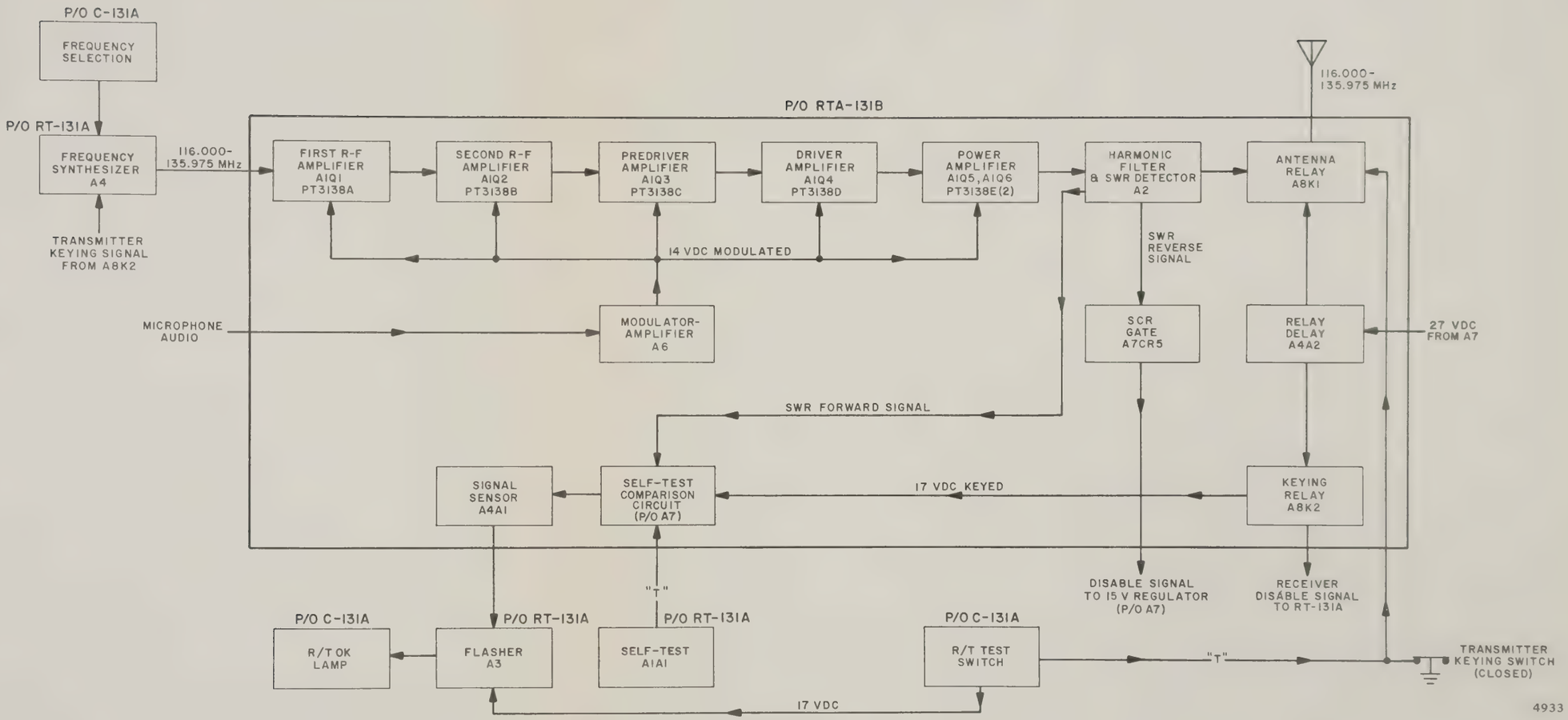

Figure 4–3. 131B Communication Set, Transmitter Circuits Block Diagram

4–3. RECEIVER-TRANSMITTER CIRCUITS.

General. (See Figure 6–1.) The RT-131A Receiver-transmitter is comprised of four individual assemblies and one chassis assembly. The principles of operation for assemblies A1, A2, and A3 are discussed in the following paragraphs. Frequency synthesizer assembly A4, which uses solid-state logic, digital, and linear circuits to produce the selected transmitter r-f frequency and the corresponding receiver local oscillator signal, is a sealed unit. The principles of operation of the frequency synthesizer are not described.

R-f Assembly A1. (See Figure 6–1.) R-f assembly A1 of the receiver-transmitter is comprised of three subassemblies: self-test assembly A1A1, r-f amplifier assembly A1A2, and balanced mixer assembly A1A3.

Self-test Assembly A1A1. Self-test assembly A1A1 supplies the audio signal for self-testing the receiver and the transmitter circuits. It includes a crystal oscillator circuit (A1A1Q1), a modulator (A1A1Q2) and a 1000-Hz oscillator circuit (A1A1Q3 and A1A1Q4). When 17 volts from the self-test switch is applied to the assembly, all three circuits are energized. The 1000-Hz oscillator is a free-running multivibrator circuit which produces a 1000-Hz signal for as long as it is energized. This 1000-Hz signal is coupled through emitter-follower A1A1Q2 to the primary winding of A1A1T1 in the crystal oscillator circuit for modulation of the crystal oscillator. A portion of the 1000-Hz signal is applied through A1A1R5 and A3R23, and through connectors A3P1, A5J1, and A5J2 to the accessory unit to provide the audio signal for the transmitter self-test circuits. The output frequency of crystal oscillator A1A1Q1 is determined by crystal A1A1Y1 (23.025 MHz). This 23.025-MHz signal is applied to the primary of A1A1T1. The modulated 23.025-MHz signal from A1A1T1 is applied to mixer A1A1CR2. At the same time, the selected receiver local oscillator signal (139.025–159.000 MHz) from the frequency synthesizer is also applied to A1A1CR2 through A1A1C3 and A1A1C4. The two signals are mixed to produce a difference frequency of 116.000–135.975 MHz. A biasing signal from the 17-volt input is applied to blocking diode A1A1CR1, forward biasing the diode. The 116.000–135.975 MHz signal is coupled through A1A1CR1 to a high-pass filter network consisting of A1A1L1, A1A1L2, A1A1C1, A1A1C2, and A1A1L3. After passing through the high-pass filter which attenuates the 23.025 MHz component of the output, the VHF test frequency is applied through A1A2R1 to the base of the r-f amplifier A1A2Q1.

R-f Amplifier A1A2. R-f amplifier assembly A1A2 amplifies the receiver r-f input signal. R-f amplifier A1A2Q1 uses an untuned, broadbanded common-emitter amplifier circuit to provide a 20-dB gain across the 116.000 to 135.975 MHz band. The circuit gain is controlled by an agc bias signal of 0.2–7 volts applied through agc diode A1A2CR1 to the amplifier input circuit.

Balanced Mixer A1A3. Balanced mixer A1A3 mixes the amplified r-f signal from A1A2 with the selected local oscillator signal from A4 to produce a first i-f signal of 23.025 MHz. The balanced mixer uses a pair of matched field-effect transistors (A1A3Q1 and A1A3Q2) connected in push-pull. The r-f signal from A1A2 is applied to the gates of the transistors, while the local oscillator signal from the frequency synthesizer is applied to the source. Bias potentiometer A1A3R1 is used for adjustment of mixer gain. Diode A1A3CR1 provides a minimum bias of approximately 0.6 volt. Potentiometer A1A3R3 in the local oscillator input circuit and capacitor A1A3C9 are used for mixer balance adjustment. The mixer balance provides at least 60 dB rejection to in-band spurious signals which are above the desired signal by half the first i-f frequency. The balanced mixer output is tuned by capacitor A1A3C10 and coupled through A1A3T2 to the 23.025-MHz crystal filter in assembly A2 of the receiver-transmitter.

I-f and Audio Assembly A2. I-f and audio assembly A2 is comprised of seven microcircuit subassemblies and a crystal filter. Crystal filter A2Z1, which has a pass bandwidth of ±18 kHz, provides the overall selectivity of the receiver. The operation of the seven microcircuit subassemblies is discussed individually in the following paragraphs. Unless otherwise noted, the circuits are illustrated in Figure 6–1.

First I-f Amplifier A2A1. First i-f amplifier assembly A2A1 amplifies the 23.025-MHz i-f signal before the first i-f signal is applied to the second mixer in A2A2. The circuit includes a field-effect transistor (FET) for automatic gain control and a NPN transistor for amplification. The input circuit is tuned to 23.025 MHz by capacitor A2A1C10 to provide a resistive termination for the crystal filter of 560 ohms. An agc signal from A2A4 is applied to the gate circuit of the FET for output stabilization. The output amplifier uses a standard, common-emitter amplifier circuit with gain adjustable by means of A2A1R11. The output circuit is tuned to 23.025 MHz by A2A1C9, and the output signal is transformer-coupled to second mixer A2A2.

Second Mixer A2A2. Second mixer assembly A2A2 is comprised of a crystal oscillator circuit and a mixer circuit. The 27.245-MHz output of the crystal oscillator is controlled by the frequency of the crystal in the oscillator circuit. The oscillator output level is adjusted by A2A2C11. The 23.025-MHz signal from A2A1 is applied to the base of the second mixer transistor circuit, while the 27.245-MHz signal is applied to the emitter circuit. The two signals are heterodyned in the mixer to produce the 4.22-MHz second i-f frequency. The primary of the second mixer output transformer is tuned to the 4.22-MHz second i-f frequency by A2A2C8, and the second i-f signal is applied to second i-f amplifier assembly A2A3.

Second I-f Amplifier A2A3. Second i-f amplifier A2A3 amplifies the 4.22-MHz second i-f signal and provides detected audio and d-c outputs. A low-pass filter in the input

attenuates the first i-f and second oscillator frequencies. An FET transistor used in the input amplifier circuit provides gain control through agc action. A tuned circuit in the collector of the output amplifier further attenuates spurious signals before the 4.22-MHz signal is applied to the diode detector through the secondary of the output transformer. The detected audio and d-c signals are applied to agc assembly A2A4 and squelch assembly A2A6.

Agc Assembly A2A4. Agc assembly A2A4 includes a d-c amplifier, a noise limiter, and an agc amplifier. After r-c filtering to remove the audio component, the detected second i-f signal from A2A3 is applied to the d-c carrier amplifier and agc amplifier.

The noise limiter uses a series diode audio switch to interrupt the audio during impulse noise spikes. This circuit provides a time constant to delay the application of the positive noise pulse to the anode while applying it undelayed to the cathode of the switch diode.

The d-c amplifier is a two-transistor amplifier which amplifies the detected d-c carrier signal for application to the carrier input of squelch assembly A2A6. Resistor A2A4R8 in the emitter circuit of the first transistor varies the amplifier gain to provide squelch carrier adjustment. The output from the d-c amplifier is also applied to A3CR1 in the flasher circuit to provide an indication of receiver output during the receiver self-test function.

The agc amplifier is comprised of two transistor amplifier circuits and an emitter-follower. The agc signal from the emitter circuit of the emitter-follower is applied to r-f amplifier A1A2, first i-f amplifier A2A1, and second i-f amplifier A2A3 to hold the gain of these stages constant.

Audio Compressor A2A5. Audio compressor A2A5 maintains a constant audio signal level so that only one volume control setting is required for a signal with varying modulation. (See Figure 4–4.) The audio signal from the noise limiter circuit in A2A4 is applied to the gate of FET Q1. The audio output from the drain of Q1 is coupled through C5 to a closed-loop leveling amplifier consisting of Q3 and Q2. The output of Q2 is transformer-coupled to a full-wave bridge for rectification. The resultant dc controls the gain of Q1. Thus, the audio output is held constant by a feedback loop. Compressor gain adjustment R1 is normally adjusted so that with a modulation variation of from 30 to 85 percent there is less than a 3-dB rise in the audio output signal level. Compressor output adjustment R8 sets the audio output signal to the rated output of 5 volts across a 250-ohm load. The compressed audio signal from A2A5 is applied to the squelch switch in A2A6.

Squelch Assembly A2A6. Squelch assembly A2A6 provides automatic squelching of the audio signal based on a predetermined signal-to-noise ratio. The assembly includes a noise amplifier, a d-c detector, a squelch gate, and a squelch switch. (See Figure 4–5.) The detected audio signal from

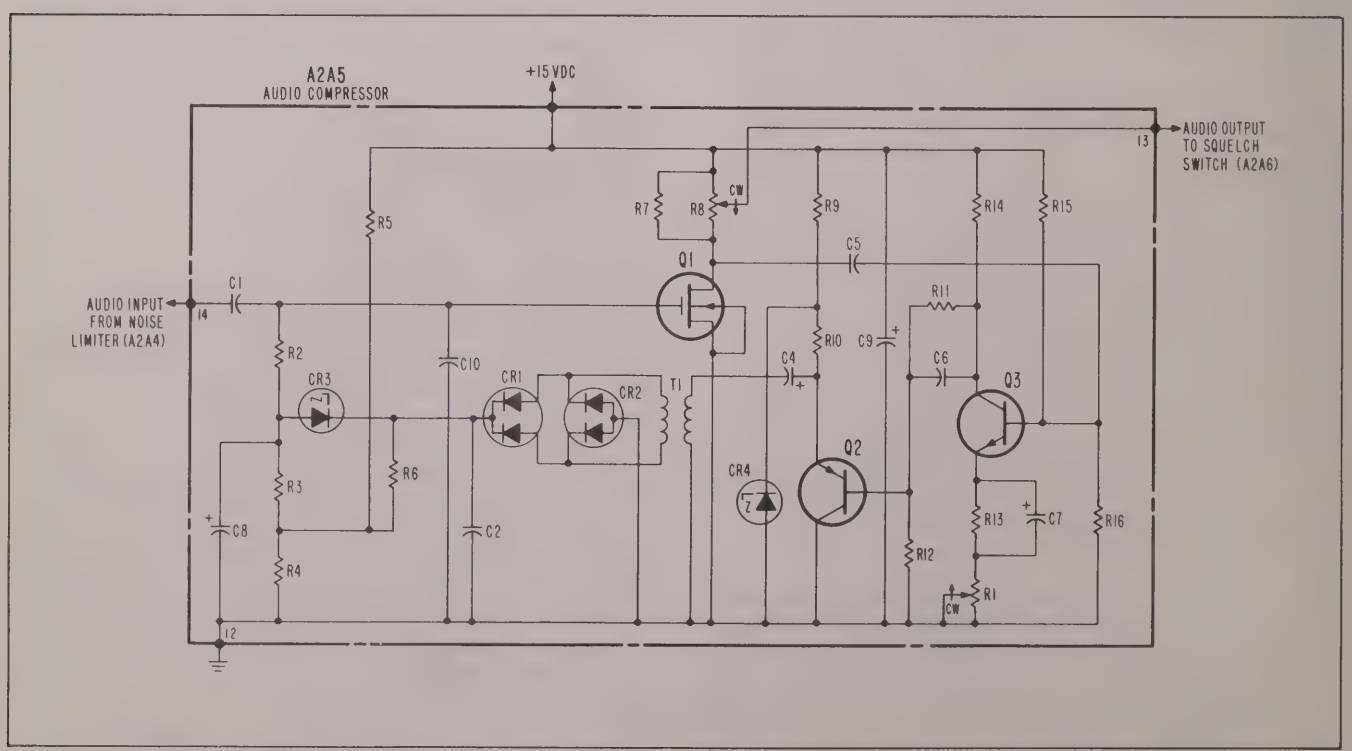

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Figure 4–4. RT-131A Receiver-Transmitter, Audio Compressor A2A5, Simplified Schematic Diagram

A2A3 is coupled through noise level adjust potentiometer R1 to the noise amplifier. The noise amplifier is comprised of two common-emitter amplifier circuits which are designed to amplify and pass only the noise frequencies in the audio signal which are above the highest voice-modulation frequencies. The high-frequency noise signal is negatively rectified in diode CR1 and the negative d-c signal is applied to the input of the squelch gate. A positive d-c carrier signal from the d-c amplifier in A2A4 is also applied to the input of the squelch gate. This carrier signal level is adjusted by A2A4R8 so that, with no noise signal, the carrier signal is just sufficient to turn on Q3 in the squelch gate. The squelch gate is a Schmitt trigger circuit comprised of Q3 and Q4. The d-c carrier input signal and the d-c noise signal at the input of Q3 are opposing voltages. As long as the noise signal is not great enough to overcome the carrier signal, Q3 is turned on and Q4 is turned off so that the potential at the collector of Q4 is highly positive, placing a forward bias on squelch switch CR2. The audio signal from audio compressor A2A5 is coupled through CR2 and an external jumper to audio amplifier A2A7. When, however, the noise signal is sufficient to overcome the carrier signal, Q3 is turned off and Q4 is turned on, dropping the collector circiut of Q4 in a negative direction. Squelch switch CR2 is reverse-biased and blocks the audio signal so that the audio is squelched.

Audio Amplifier A2A7. Audio Amplifier A2A7 amplifies the audio signal from the squelch circuit and applies it through A2T1 to the receiver phone output. The circuit includes an RCA CA3020 integrated circuit which amplifies the audio signal to a phone output level of 100 milliwatts.

Regulator Assembly A3. Regulator assembly A3 includes a flasher circuit, which is part of the self-test circuit, a 5-volt regulator, and a 15-volt switch. The flasher is used to supply a steady d-c signal or an intermittent d-c signal to the R/T OK lamp on the control unit during self-test, and a varying modulation signal during normal transmission. When either the receiver or transmitter self-test function is selected on the R/T TEST switch, 17 volts through the switch is applied to terminal A of the flasher circuit. When a positive voltage is not present on the anode of diode A3CR1 or A3CR2, the flasher circuit operates as follows.

The R/T OK lamp, which is in series with the emitter of A3Q1, is turned on any time A3Q1 conducts. When the 17-volt test voltage is applied to the emitter of A3Q2 through blocking diode A3CR5, the base of A3Q2 goes less positive than its emitter as A3C1 charges through A3CR3, A3R4, A3R5, and A3R8. When A3Q2 conducts, the collector voltage across A3R9 also appears instantaneously across A3R3. This positive voltage exceeds the emitter voltage of A3Q1 and causes A3Q1 to conduct heavily. The voltage across A3R3 drops as A3C2 charges to the voltage across A3R9. At the same time, A3C1 discharges through A3R5, A3Q1, and A3R8, raising the base voltage on A3Q2 to the cutoff level. When A3Q2 ceases to conduct, A3C2 discharges

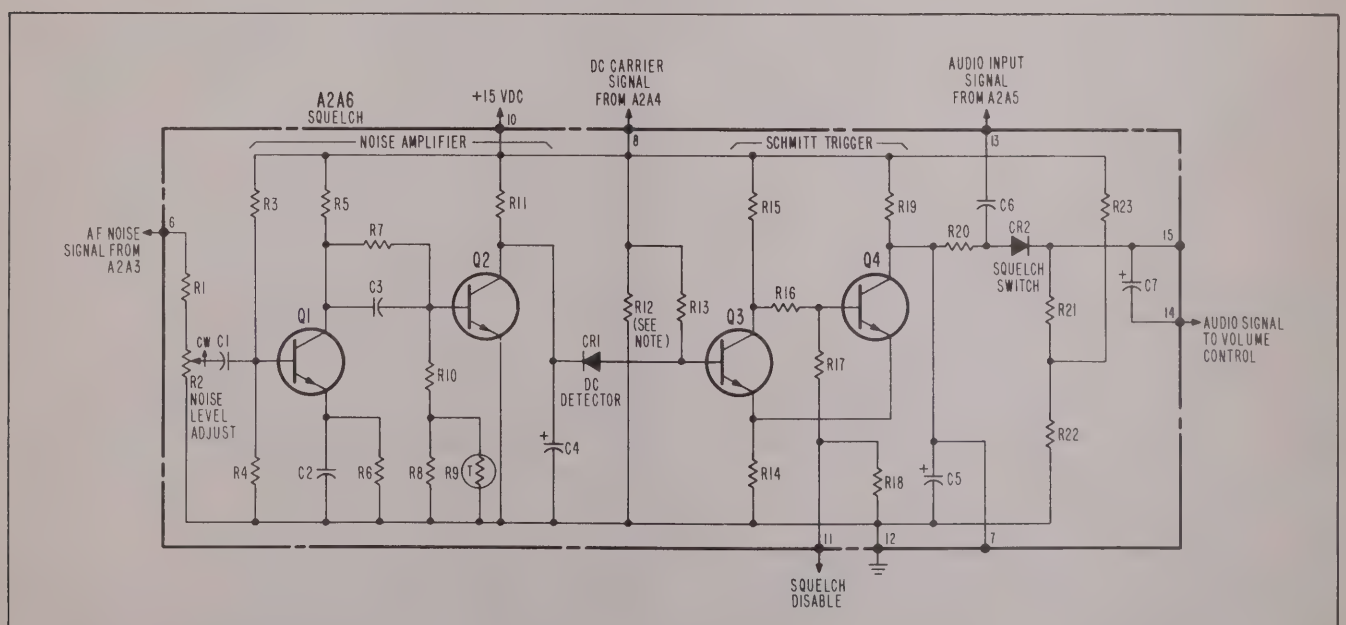

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Figure 4–5. RT-131A Receiver-Transmitter, Squelch Assembly A2A6, Simplified Schematic Diagram

through A3R3 and A3R9; also, A3Q1 ceases to conduct and the R/T OK lamp is turned off. This cycle is repeated, causing the lamp to flash until a positive voltage resulting from a receiver or transmitter OK positive voltage being applied through either diode A3CR1 or A3CR2 appears on the base of A3Q1.

During normal transmission, the keyed 17 volts is applied through diode A3CR8 to provide a collector supply for A3Q1. When the signal sensor A4A1 in the RTA-131B senses at least 50 percent modulation from the SWR detector, a positive voltage from A3CR2 appears on the base of A3Q1. This voltage is sufficient to cause A3Q1 to conduct and light the R/T OK lamp.

The 5-volt regulator circuit converts the 10-volt input from the accessory unit to a regulated 5-volt output for use in frequency synthesizer A4. Series regulator A3Q3 is driven by A3Q4 and A3Q5. Voltage sensor A3Q6 and reference diode A3CR7 provide stabilization of the 5-volt output.

The 15-volt switch circuit (A3Q7) is used to disable the receiver circuits during transmission to prevent receiver overload and blocking. A ground return for the base circuit of A3Q7 is provided during receiver operation by keying relay A8K2 in the accessory unit. This causes A3Q7 to conduct and supply 15 volts to the receiver circuits. When the transmitter key switch is closed for transmission and A8K2 of the accessory unit is energized, the ground return for the base circuit of A3Q7 is interrupted, A3Q7 ceases conduction and the receiver circuits are deenergized.

4–4. ACCESSORY UNIT CIRCUITS.

General. (See Figure 6–4.) The accessory unit is comprised of seven individual assemblies and one chassis assembly. The operation of assemblies A1 through A7 are discussed in the following paragraphs. The operation of relays A8K1 and A8K2, test switch A8S1, and other components of chassis assembly A8 are discussed with the circuits to which their operation is related.

Transmitter Amplifier A1. Transmitter amplifier A1 includes all of the transmitter r-f amplifier circuits. It is comprised of two Class A r-f amplifier stages, a Class AB predriver amplifier, a Class C driver amplifier, and a Class C push-pull power amplifier. The six transistors used are a matched set, but any of them may be individually replaced. All five stages use common-emitter amplifier circuits with transformer coupling between stages.

When the transmitter keying switch is closed, 15 volts from assembly A7 is applied through A1CR1 to all five stages. To produce linear modulation, a modulated 14-volt signal from modulator-amplifier A6 is also applied to all five stages. Clamping diode A1CR1 prevents downward modulation signals from driving the 14-volt bus in a negative direction. Steering diodes A1CR2 and A1CR3 cause more upward modulation signals to be applied to the r-f amplifier and predriver stages so that a high level of modulation is maintained by automatically increasing the drive level on upward modulation peaks. Modulation limiter A1CR4 prevents the modulation signal from rising beyond the point at which peaks from the modulating signal might cause the power amplifier transistors to break down. The transmitter signal from A1 is applied to harmonic filter and SWR detector A2.

Harmonic Filter and SWR Detector A2. Assembly A2 is comprised of a harmonic filter and an SWR detector circuit. The harmonic filter is a conventional low-pass filter with a cutoff between 140 and 150 MHz which suppresses harmonics of the transmitter output signal. The SWR detector consists of two directional couplers which sample the forward and reflected standing waves on the transmission line to the load. When the transmitter is improperly loaded, the SWR detector reverse output exceeds a predetermined level and turns off the transmitter while the mismatched load persists.

The SWR detector consists of a small section of 50-ohm coaxial line and two directional couplers. The 50-ohm line is connected in series with the harmonic filter and the antenna relay. Each directional coupler includes a sensing coil, a series resistor, and a diode rectifier circuit. The reverse signal sensing circuit additionally includes a voltage doubler diode and a filter circuit to minimize the effect of modulation peaks on the detected d-c output signal. The sensing coil of each circuit is coupled to the center conductor of the 50-ohm line by means of mutual inductance and capacitive coupling. The forward and reverse coupling coils are positioned 180° out of phase with each other so that both a positive and a negative mutual inductance is obtained. When power is passed through the 50-ohm line, an r-f voltage is produced across the series resistor in each sensing circuit. The magnitude of this voltage is proportional to the direction and magnitude of the power flow. The direction of power flow is detected by comparing the capacitive and inductive components of current in the resistor. The r-f voltage for each sensing coil is rectified and the resulting d-c signal is used for control. The "forward" (positive) d-c signal from the in-phase sensing circuit is applied to the self-test audio circuit in A7 to be used for modulation indication. The "reverse" d-c signal which is proportional to the flow of power back from the antenna load is applied to the gate of SCR A7CR5 in the 15-volt regulator circuit in A7 to turn off the transmitter for as long as a mismatched load persists.

Test jack A8J6 provides a convenient point for measuring the reverse signal. Test switch A8S1 in the reverse signal line provides a means for interrupting the reverse signal operation so that the transmitter circuits can be tested without the antenna circuit connected. The switch disables the reverse signal to the gate of SCR A7CR5 so that the transmitter circuits are not shut off by the reverse signal.

Bandpass Filter A3. Bandpass filter A3 is inserted in the receiver antenna input circuit between the antenna and the coaxial antenna relay. It is a broadband passive filter which has a passband of 116 to 136 MHz with a center frequency of 127 MHz. The insertion loss of the filter is approximately 3 dB between 116 and 136 MHz. The filter output is connected directly to the receiver input in the receiver-transmitter.

Signal Sensor and Relay Delay A4. Assembly A4 is comprised of two microcircuit subassemblies: signal sensor A4A1 and relay delay A4A2. The signal sensor is used in the transmitter modulation indicator and transmitter self-test circuits. The relay delay assembly provides a timing circuit which prevents the transmitter amplifier circuits from being energized until after the antenna circuit has been connected to the transmitter.

Signal Sensor A4A1. Signal sensor A4A1 along with the self-test audio circuit in assembly A7 (see Figure 4–6), provides a modulation indication during transmission and supplies a self-test signal during transmitter self-test. Signal sensor A4A1 is comprised of two a-c amplifiers, a diode detector, and two d-c amplifiers. All four amplifier circuits use common-emitter configurations.

During normal transmitter operation, 20 volts dc from regulator A5 is applied to terminal 9 of A4A1, and a keyed 17-volt signal from A8K2 is dropped across A7R14 to provide 14.5 volts at terminal 7 of A4A1. Blocking diode A7CR8 is normally turned off by a reverse bias from A7R15. The d-c component of the forward signal from SWR detector A2 applied through A7R18 provides the necessary voltage to overcome the reverse bias on A7CR8. The varying modulation on the forward signal provides an audio input signal through A7CR8 to the signal sensor. The output signal from A4A1 varies directly with the modulation signal applied. This output signal is applied to the flasher circuit in regulator A3 of the receiver-transmitter. When the output of A4A1 exceeds the output generated by 50 percent modulation, A3Q1 in the flasher circuit conducts and provides lighting current in the self-test indicator lamp.

When a transmitter self-test signal is selected on the control unit, the operation of the signal sensor is as described previously, except that no modulation signal is present. A test audio signal from self-test assembly A1A1 in the receiver-transmitter is applied through A7R19, A7C8, and A7CR8 to signal sensor A4A1.

Test audio control A7R19 is adjusted to provide a 10-volt output level from terminal 13 on A4A1. When an audio signal of at least 50 mV is applied to terminal 6 of A4A1, and the 14.5-volt and 20-volt supply voltages are applied to terminals 7 and 9, the output signal from A4A1 is 10 volts dc. This 10-volt signal applied to the flasher in A3 of the receiver-transmitter causes the test lamp on the control unit to light and glow steadily. When a malfunction has occurred

A4A1 SELF-TEST VARIANCE TABLE

AUDIO IN	14.5 VDC IN	20 VDC IN	DC OUTPUT TO FLASHER	LAMP INDICATION
0	0	0	0	NONE
0	14.5V	20V	2.5V	BLINKS
50mV	14.5V	20V	10V	STEADY GLOW

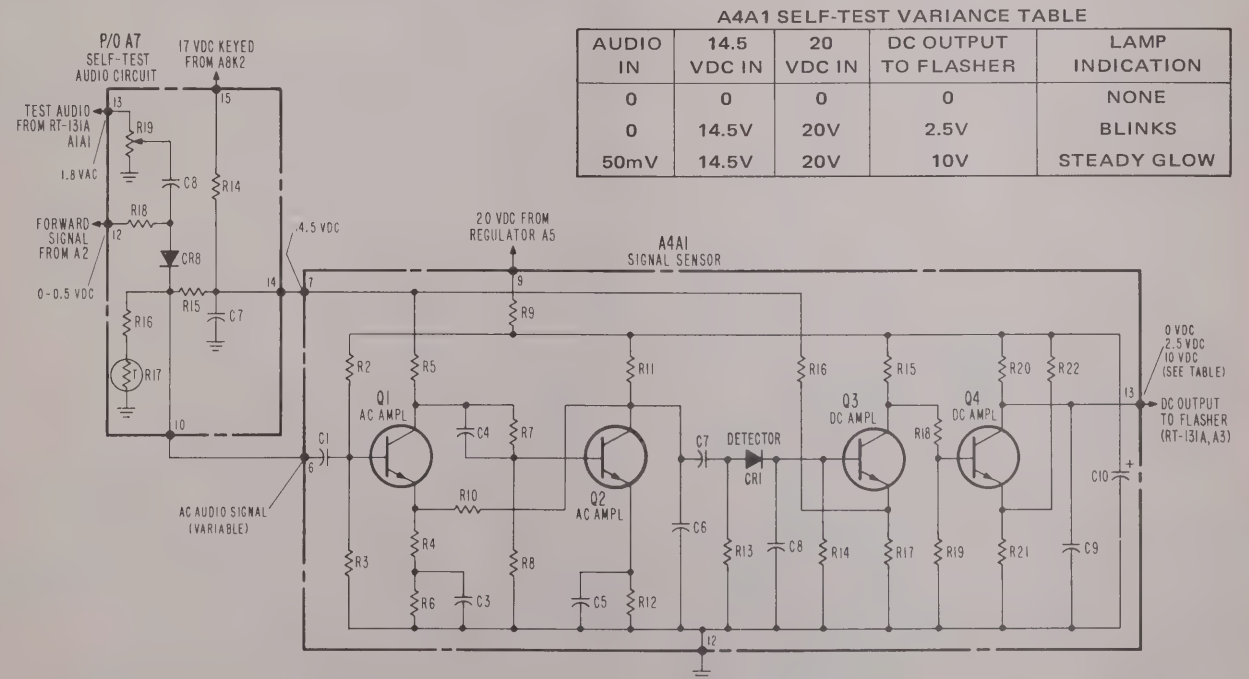

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Figure 4–6. RTA-131B Accessory Unit, Transmitter Self-Test Audio and Signal Sensor Circuits, Simplified Schematic Diagram

in a transmitter circuit, the d-c component of the forward signal applied to A7R18 is not great enough to overcome the bias on A7CR8, and the test audio signal is blocked. With no audio input signal present, the output from A4A1 is only 2.5 volts dc. This signal is not great enough to completely turn on the flasher circuit in A3 of the receiver-transmitter, and the test lamp on the control unit blinks on and off.

Relay Delay Assembly A4A2. (See Figure 4–7.) Delay assembly A4A2 directly controls the energized circuits of antenna relay A8K1 and keying relay A8K2. When the 131B is energized, 27 volts from A7 is applied to terminal 4 of A4A2. When the transmitter keying switch is closed, terminal 5 of A8K1 and terminal 1 of A4A2 are placed at ground potential, forward-biasing blocking diodes CR1 and CR2. The 27-volt source from A7 is applied through the diodes to terminal 4 of A8K1, energizing the antenna relay approximately 10 ms after the keying switch is closed.

At the same time, the 27-volt signal is applied to the input of Q1. The voltage drop across CR1 and CR2 charges C2 through R2 causing the transistor to conduct after a brief delay. A 26.4-volt signal in the output of Q1 is applied to terminal 13 of A8K2, energizing the keying relay approximately 20 ms after the keying switch is closed. A 27-volt signal through the normally-open contacts of A8K2 is applied to the 15-volt regulator circuit in A7 to provide a low-voltage input to the transmitter. The operating delay of approximately 20 ms for A8K2 assures that the antenna circuit is switched to the transmitter output before power can be applied to the transmitter.

When the transmitter keying switch is released, diode CR4 turns A8K2 off rapidly (within 10 ms) and provides reverse polarity protection for Q1. The current through the coil of A8K1 is maintained by the discharge of C1 delaying the drop-out of A8K1 for approximately 25 ms after the transmitter keying switch has been released.

Regulator A5. Regulator A5 includes a 20-volt regulator circuit and a 17-volt regulator circuit to convert the 27.5-volt primary input to a 20-volt output and a 17-volt output for use in the receiver-transmitter and accessory unit circuits. The 20-volt regulator is supplied through fuse A5F1 directly from the aircraft primary source so that the speaker amplifier circuit in A6 can be energized independently. The 20-volt regulator is comprised of current amplifier A5Q1, pass amplifier A8Q1, voltage sensor A5Q2, blocking diode A5CR5, voltage dropping diode A5CR2, and reference diode A5CR1. The 20-volt output is distributed as described in paragraph 4–2.

The 27-volt input to the 17-volt regulator is supplied through the transient protector power switch in assembly A7. The 17-volt regulator circuit is comprised of current amplifier A5Q4, pass amplifier A8Q2, voltage sensor A5Q5, voltage reference diode A5CR3, and voltage dropping diode A5CR4. The 17-volt output is distributed as described in paragraph 4–2.

Modulator-Amplifier A6. Modulator-amplifier A6 amplifies the audio signal to drive the cabin speaker during receive condition and limits and amplifies the modulation signal during transmit condition. The assembly is comprised of three microcircuit subassemblies and a power amplifier circuit. The microcircuit subassemblies are: audio limiter A6A1, audio switch A6A2, and audio amplifier A6A3.

Audio Limiter A6A1. Audio limiter A6A1 prevents overmodulation of the transmitter by limiting the audio signal level which is applied to the modulation amplifiers. When the transmitter keying switch is closed, the microphone

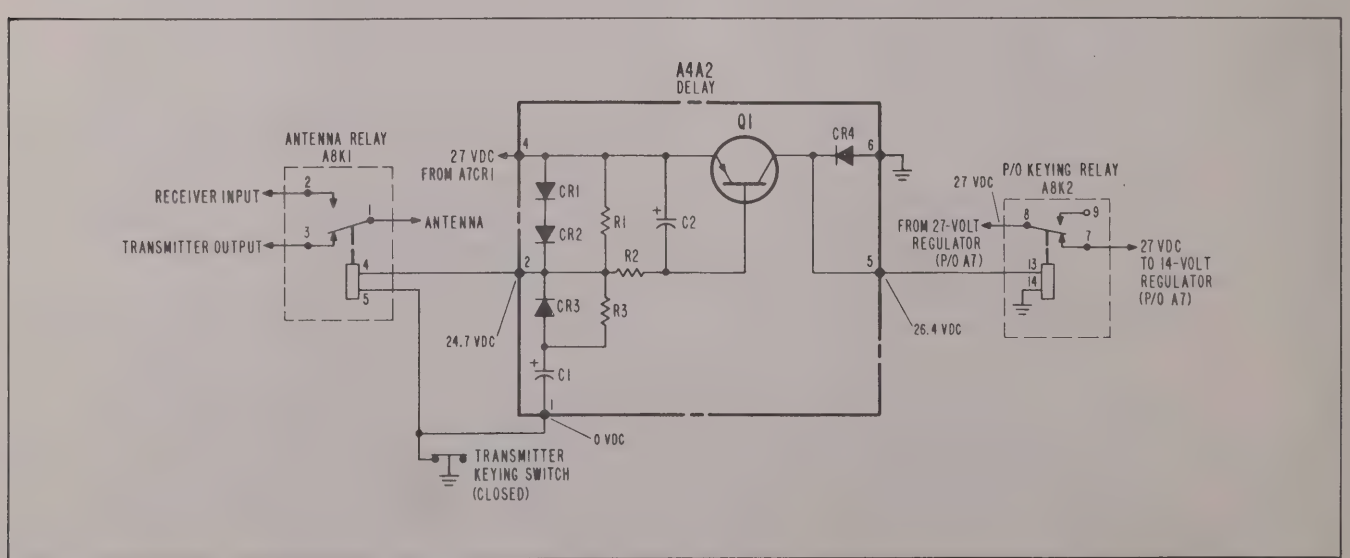

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Figure 4–7. RTA-131B Accessory Unit, Relay Delay A4A2, Simplified Schematic Diagram

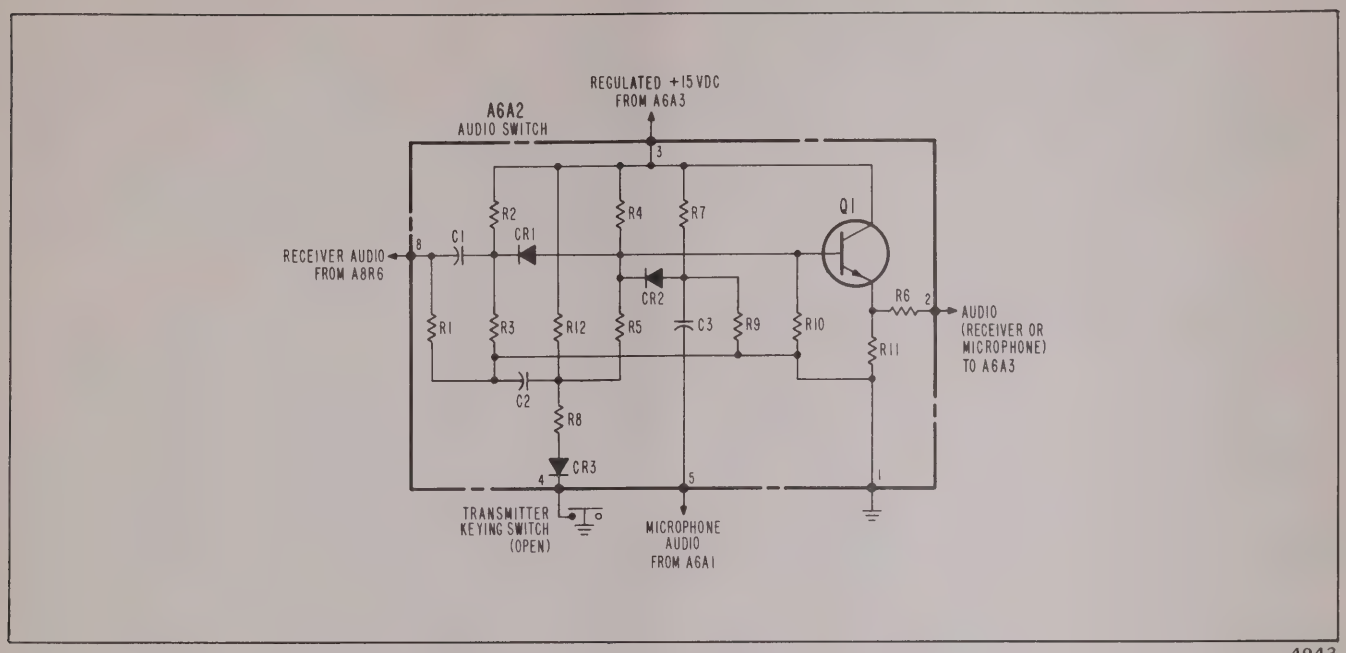

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Figure 4–8. RTA-131B Accessory Unit, Audio Switch A6A2, Simplified Schematic Diagram

audio signal is applied to input terminal 7 of the audio limiter, and 15 volts from A7 is applied through A8J5 and A6P3 to the resistor bias network in A6A1. The level of limiting can be varied by the setting of A6A1R4 (see Figure 6–4). When the microphone signal exceeds the preset level established by A6A1R4, the limiting diodes in the circuit clip the positive and the negative peaks from the signal to maintain a peak swing of approximately 0.6 volt. The output level for the circuit is established by the setting of A6A1R5. A6A1R5 in conjunction with its shunt output capacitor provides reduction of harmonic distortion by rolling-off the higher frequencies. The limited microphone audio signal from A6A1 is applied to audio switch assembly A6A2.

Audio Switch A6A2. Audio switch assembly A6A2 determines whether the audio signal from the receiver or from the microphone is applied to audio amplifier A6A3. (See Figure 4–8.) During the receive condition (transmitter keying switch open), switching diode CR1 is forward-biased so that the audio signal from the receiver is applied to audio amplifier Q1. When the transmitter keying switch is closed, it connects control diode CR3 to ground, turning on CR2. With CR2 forward-biased, CR1 is turned off, connecting the microphone audio signal through CR2 to the input of amplifier Q1. The amplified signal from Q1 (receiver audio or microphone audio) is applied to audio amplifier A6A3.

Audio Amplifier A6A3 and Power Amplifier. Audio amplifier A6A3 amplifies the receiver audio or the microphone audio signal and provides a split-phase output to drive the push-pull power amplifier in A6. The assembly includes a voltage regulator circuit, an input amplifier, a phase splitter, and two emitter-follower circuits. The power amplifier comprised of A6Q1 and A6Q2 is a push-pull amplifier. The output is transformer-coupled to the transmitter and speaker circuits.

The voltage regulator in A6A3 consists of a single transistor circuit and a Zener diode which convert the 20-volt signal from A5 to a regulated 15-volt supply for use in assemblies A6A2 and A6A3. The input audio amplifier uses a conventional common-emitter amplifier circuit to provide voltage amplification for the audio signal from A6A2. This amplified audio signal is then applied to the phase splitter, where the positive-going portion of the audio signal in the collector circuit is applied to one emitter-follower, and the negative-going portion of the audio signal in the emitter circuit is applied to the other emitter-follower. The positive-going portion of the audio signal is applied to power amplifier A6Q1 and the negative-going portion to A6Q2. The two diodes in A6A3, along with biasing diodes A6CR1 and A6CR2, are used to minimize the cross-over distortion in the power amplifier circuit and to provide temperature compensation for the power amplifier transistors.

Power amplifiers A6Q1 and A6Q2 equally amplify the two portions of the audio signal and apply them simultaneously to the input winding of A6T1. A portion of the output of A6Q2 is returned as negative feedback to the emitter circuit of the input amplifier in A6A3 to reduce distortion and to maintain a constant output level. Output transformer A6T1 uses separate output windings to supply the two functions of the audio amplifier. During receive condition, output winding 6,7 supplies the amplified audio signal to the cabin speaker. During transmission, output winding 4,5 supplies a

modulated 14-volt signal to transmitter-amplifier A1 to modulate the transmitter amplifier stages, and output winding 6,7 supplies a sidetone signal through A8R3 and A8R5 to the headset and speaker circuits. Zener diode A8CR1 is a voltage-dropping diode which reduces the 20-volt signal from A5 to a 7.8-volt signal for use in the amplifier circuits of A6.

Transient Protector Power Switch A7. Transient protector power switch A7 includes a 27-volt power switch, a 15-volt regulator, and a self-test audio circuit. The operation of the self-test audio circuit is described with signal sensor A4A1. The 27-volt power switch provides a switched 27-volt source and protects the various circuits of the set from transients on the primary line. It also includes a switch circuit which shuts off the equipment when there is a short circuit on the 27-volt bus. The 27.5-volt input from the aircraft primary source is applied to the collector circuit of A7Q1. When the on-off switch on the control unit is closed, it completes the ground circuit for reverse polarity protection diode A7CR4. The charging current of A7C2 turns on power switch A7Q3, which turns on 27-volt switch A7Q1, A7Q2. A7Q3 in turn is held on by the 27-volt output of A7Q1. Blocking diode A7CR1 is forward-biased, applying a 27-volt signal to relay delay assembly A4A2. The 27-volt output is applied to the 17-volt regulator circuit in A5, and to the normally open contacts of keying relay A8K2. When a short circuit is present on the 27-volt output line, the forward bias on A7Q3 is dropped below the conduction level and A7Q3 is turned off, turning off the 27-volt circuit for as long as the short circuit condition persists.

When the transmitter keying switch is closed, A8K2 is energized. The 27-volt supply through A8K2 is applied to the 15-volt regulator circuit in A7. Regulators A7Q4 and A7Q5 are connected in parallel and driven by A7Q6 which is controlled by voltage sensor A7Q7 and reference diode A7CR6 to provide a regulated 15-volt supply for the transmitter circuits. When the antenna circuit presents an improper load for the transmitter, a positive voltage from SWR detector in A2 is applied through A7R8 to the gate of A7CR5. When A7CR5 fires, it reduces the collector voltage of A7Q7 and turns off the 15-volt supply to the transmitter circuits for as long as the mismatch loading condition persists.

SECTION 5

MAINTENANCE

5–1. INTRODUCTION.

This section contains maintenance information for the 131B Communication Set. It includes removal and replacement procedures, equipment performance tests, and alignment and adjustment procedures. Typical voltage and gain measurements for the receiver-transmitter are shown on Figure 6–1; those for the accessory unit are shown on Figure 6–4. The performance of individual units may be checked by substituting a reliable unit and making a comparative test. Referring to the principles of operation in Section 4 will aid in localizing trouble.

5–2. TEST EQUIPMENT AND ACCESSORIES.

Table 5–1 lists the test equipment and accessories required for maintenance of the 131B; equivalent test equipment may be substituted. A regulated low-voltage source is also required.

5–3. REMOVAL AND REPLACEMENT.

General. Parts locations for the receiver-transmitter are shown on Figures 6–2 and 6–3. Parts locations for the accessory unit are shown on Figures 6–5 and 6–6. An exploded view of the control unit is shown in Figure 7–1. The receiver-transmitter consists of four individual assemblies and one chassis assembly. These assemblies are visible when the dust cover is removed from the unit. The three subassemblies of A1 are enclosed in a common shield cover which is held with four screws. Except for the replacement of frequency synthesizer A4, no special disassembly procedures are required to remove and replace the receiver-transmitter assemblies.

The accessory unit consists of seven individual assemblies and one chassis assembly. To expose the assemblies of the accessory unit, remove the side panels and remove the four screws that secure the heat sink assembly (part of assemblies A1 and A6) to the top of the unit. When the heat sink assembly is lifted aside, all of the seven assemblies of the accessory unit are accessible.

Replacement of Semiconductors. The receiver-transmitter uses 14 transistors and 12 diodes that are individually replaceable. The accessory unit uses 21 transistors and 20 diodes that are individually replaceable. The control unit uses 17 individually replaceable diodes. The semiconductors in the microcircuit assemblies in both the receiver-transmitter and the accessory unit and the three diodes in harmonic filter and SWR detector A2 of the accessory unit are not replaceable individually but only as part of the assembly. Table 5–2 lists the type and the function of the individually replaceable semiconductors. The locations of the semiconductors in the receiver-transmitter are shown on Figures 6–2 and 6–3; those for the accessory unit are shown on Figures 6–5 and 6–6; and those for the control unit are shown on Figure 6–8.

All semiconductors in the receiver-transmitter and in the control unit are soldered in the circuit. In the accessory unit, all diodes and all but two of the transistors are soldered in the circuit. Regulators A8Q1 and A8Q2 are plugged into sockets and secured with two screws each. Power amplifiers A6Q1 and A6Q2 are mounted to the heat sink of A6 with two screws and nuts each, while A7Q1, A7Q4, and A7Q5 are plugged into sockets and are secured to the heat sink of A7 with two screws each. For all of the transistors mounted with screws, the body of the transistor is an active element. Mica washers coated with silicon compound are installed under the body of each of these transistors to insulate them from the chassis. Regulators A8Q1 and A8Q2 on the back of the chassis are also protected with plastic caps over the transistors. When replacing any of the screw-mounted transistors, carefully remove the mica washer and examine it for damage. Install the mica washer under the replacement transistor. When replacing A7Q1, A7Q4, or A7Q5, also make sure that the insulating spacers are reinstalled under the heads of the mounting screws. Make sure the plastic caps are replaced on A8Q1 and A8Q2.

Since semiconductors may be easily damaged during removal, and to avoid unnecessary wear on printed circuit boards, do not remove and replace semiconductors or other components until adequate circuit measurements have been made to verify that the component is defective. Use a heat sink when soldering a replacement semiconductor in a circuit. Upon completion of the repair, recheck the semiconductor connections before applying power to the equipment.

TABLE 5–1. TEST EQUIPMENT AND ACCESSORIES

Quantity	Name	Description or Characteristics
	TEST EQUIPMENT	
1	Attenuator, 20 dB	Empire Devices Model AT-70
1	Attenuator, 50 dB	Applied Research Type HFA-50
1	Attenuator, 6 dB	Hewlett-Packard Model 00505B
1	Attenuator, 9 dB	Hewlett-Packard Model 355A[1]
1	Audio Oscillator	Hewlett-Packard Model 200AB
1	Audio Power Meter	General Radio Type 1840-A
1	Frequency Counter	Hewlett-Packard Model 524C
1	Oscilloscope	Tektronix Model 545B
1	R-f Voltmeter	Boonton Electronics Model 91C
1	R-f Wattmeter (with 100-250 MHz 25-watt element)	Bird Electronics Thruline Model 43
1	Signal Generator	Hewlett-Packard Model 608D
1	Signal Generator	Measurements Model 65-B
1	Sweep Frequency Generator	Kay Electric Model 159B, with PM7660 head
1	Spectrum Analyzer	Nelson Ross Type NR
1	Voltmeter	Ballantine Model 300D
1	Voltmeter	Hewlett-Packard Model 410B
	ACCESSORIES	
1	Linear Detector	(Fabricate; see Figure 5–2)
1	Contact Removal Tool	Cannon CET-C6B
1	Ammeter	0–5 amperes
1	Capacitor	.01 μF
1	Capacitor	1 μF
1	Capacitor	47 μF
1	Resistor	50 ohms
1	Resistor	100 ohms
1	Resistor	560 ohms
1	Resistor	7500 ohms

[1] Any fixed 9-dB attenuator may be substituted.

Replacement of Fuses. The accessory unit includes three fuses which are soldered in the circuit. As shown in Figure 6–6, two fuses, A5F1 and A5F2, are included on regulator assembly A5. The other fuse, A8F1, is located on the side of A8J5. To replace any of the fuses, unsolder the defective fuse and solder the replacement fuse in place.

Replacement of Microcircuit Assemblies. Assembly A2 of the receiver-transmitter is comprised of seven nonrepairable microcircuit assemblies and one crystal filter soldered to a printed circuit interconnection board. (See Figure 6–2 to locate the assemblies.) Any of the microcircuit assemblies or the filter may be individually replaced by unsoldering the defective item and soldering the replacement assembly to the printed circuit board.

The accessory unit includes five microcircuit assemblies. Two of these assemblies comprise signal sensor and delay assembly A4. Either of these microcircuit assemblies of A4 may be individually replaced. Modulator-amplifier assembly A6 includes three microcircuit assemblies which may be individually replaced. (See Figure 6–5 for the microcircuit assembly locations.)

CAUTION

Do not remove and replace microcircuit assemblies until adequate circuit measurements have been made to verify that the assembly is defective. Use care when soldering a replacement assembly to the printed circuit board since all microcircuit assemblies include semiconductor devices which may be damaged by improper handling.

TABLE 5–2. SEMICONDUCTOR DATA

Reference Designation	Type	Function
RECEIVER-TRANSMITTER		
A1A1CR1	1N914	Self-test Blocking Diode
A1A1CR2	1N270	Self-test Mixer
A1A2CR1	1N458	AGC Diode
A1A3CR1	1N458	Bias Clamp
A3CR1	1N459	Receiver Test Gate
A3CR2	1N459	Transmitter Test Gate
A3CR3	1N459	Blocking Diode
A3CR4	1N459	Blocking Diode
A3CR5	1N459	Blocking Diode
A3CR6	1N459	Blocking Diode
A3CR7	1N459	Clamping Diode
A3CR8	1N4370	Zener Diode
A1A1Q1	40245	Crystal Oscillator
A1A1Q2	2N3794	Self-test Modulator
A1A1Q3	2N3794	1000-Hz Oscillator
A1A1Q4	2N3794	1000-Hz Oscillator
A1A2Q1	A466	R-f Amplifier
A1A3Q1	SFB8084	Balanced Mixer
A1A3Q2	SFB8084	Balanced Mixer
A3Q1	2N3794	Flasher
A3Q2	2N3703	Flasher
A3Q3	2N3054	5-volt Regulator
A3Q4	2N3794	5-volt Regulator
A3Q5	2N3794	5-volt Regulator
A3Q6	2N3703	5-volt Regulator
A3Q7	2N3703	15-volt Switch
ACCESSORY UNIT		
A1CR1	1N645	Clamping Diode
A1CR2	1N645	Modulation Steering Diodes
A1CR3	1N645	Modulation Steering Diodes
A1CR4	UZ5733	Modulation Limiter
A5CR1	1N4740	Voltage Reference Diode
A5CR2	1N754	Voltage Dropping Diode
A5CR3	1N754	Voltage Reference Diode
A5CR4	1N754	Voltage Dropping Diode
A5CR5	1N91	Blocking Diode

Reference Designation	Type	Function
ACCESSORY UNIT—Continued		
A6CR1	1N4003	Temperature Compensation Diode
A6CR2	1N4003	Temperature Compensation Diode
A7CR1	1N484A	Blocking Diode
A7CR2	1N484A	Stabilizer
A7CR3	1N484A	Stabilizer
A7CR4	1N484A	Reverse Polarity Protector
A7CR5	2N2323	Reverse Bias Gate
A7CR6	1N752	Reference Diode
A7CR7	1N752	Voltage Dropping Diode
A7CR8	1N270	Diode Switch
A8CR1	UZ5812	Voltage Dropping Diode
A1Q1	PT3138A	First R-f Amplifier
A1Q2	PT3138B	Second R-f Amplifier
A1Q3	PT3138C	Predriver
A1Q4	PT3138D	Driver
A1Q5	PT3138E	Power Amplifier
A1Q6	PT3138E	Power Amplifier
A5Q1	2N3053	20-volt Current Amplifier
A5Q2	40232	20-volt Voltage Sensor
A5Q4	2N3053	17-volt Current Amplifier
A5Q5	40232	17-volt Voltage Sensor
A6Q1	36370-0549	Audio Power Amplifier
A6Q2	36370-0549	Audio Power Amplifier
A7Q1	2N5036	27-volt Power Switch
A7Q2	2N4235	27-volt Power Switch
A7Q3	2N3053	Power Switch
A7Q4	2N5036	15-volt Regulator
A7Q5	2N5036	15-volt Regulator
A7Q6	2N3053	15-volt Regulator
A7Q7	2N3053	15-volt Regulator
A8Q1	2N3005	20-volt Pass Amplifier
A8Q2	2N3055	17-volt Pass Amplifier
CONTROL UNIT		
CR1-CR17	1N270	Isolation Diodes

Removal of Control Unit Frequency Stop. To remove the stop in the control unit to permit the use of 116 and 117 MHz, refer to the exploded view of the control unit in Figure 7–1 and proceed as follows:

Step 1. Remove two screws (2, Figure 7–1) and remove cover (1) from the control unit.

Step 2. Remove screw (30) located on the lower edge of the counter plate.

Step 3. Lift off stop bracket (31).

Step 4. Replace cover (1) on control unit and secure with two screws (2).

Replacement of Frequency Synthesizer. Frequency synthesizer A4 of the receiver-transmitter is a sealed assembly which can be serviced only at factory-designated repair shops. Warranty for the assembly is void if the seal is broken. To replace the frequency synthesizer assembly, see Figure 6–2 and proceed as follows:

Step 1. Remove dust cover from receiver-transmitter; remove two screws from rear cover and remove cover.

Step 2. Remove two screws that hold plate assembly of A3 to rear of chassis.

Step 3. From top side of unit, remove hexagonal post located between assemblies A1 and A2.

Step 4. Through hole in front left-hand corner of the printed circuit board of A2, remove screw and spacer that hold A4.

Step 5. Remove four screws, two from the top and two from the bottom, that hold the receiver-transmitter subassembly to the front of the chassis.

Step 6. Lift receiver-transmitter subassembly away from chassis, disconnecting A3P1 from A5J1.

Step 7. Disconnect A4P3 from A1A3J1.

Step 8. Using Cannon CET-C6B contact removal tool, remove coaxial contact A1 from connector A3P1.

Step 9. Disconnect A5P2 from A4J1.

Step 10. Remove three flat-head screws that hold A4 to the right side plate of the subassembly.

Step 11. Unsolder interconnecting wires and remove frequency synthesizer.

Step 12. To install replacement assembly, refer to Figure 6–2 for wiring information and reverse procedures of Steps 1 through 11.

5–4. GENERAL BENCH TEST INFORMATION.

Interconnection of Units of 131B Set. Bench test cable assemblies (not supplied) must be fabricated to interconnect the units of the 131B for bench testing. The cable assemblies shown in Figure 5–1 are recommended since they provide convenient test connections and a squelch disable switch. The tests described in this section refer to the use of these cable assemblies.

Interconnection of 131B and Test Equipment. Interconnecting cables between the 131B and the test equipment (when not supplied as test equipment accessories) are fabricated as required from RG-58/U coaxial cable and suitable connectors. A linear detector (see Figure 5–2) must also be fabricated.

Test Conditions. For bench testing the 131B, the following test conditions apply, unless otherwise specified.

Input Power. Input power for the 131B is 1.5 amperes at 27.5 volts dc for receive and 6.5 amperes at 27.5 dc for transmit, supplied from a regulated dc power supply.

Phone Output. Phone output is the audio signal supplied from the receiver through the volume control on the control unit measured across a 250-ohm load.

Signal Generator Output. Use care in connecting the units of the 131B and the signal generator to ensure proper interpretation of results. All of the signal generator output-microvolt values given in the procedures in this section are in terms of "hard" (open-circuit) microvolts.[1] When the Hewlett-Packard 00505B Attenuator (6-dB pad) is used, the attenuator dial of the signal generator reads "hard" microvolts directly. If the signal generator output is connected to the receiver without a 6-dB pad, the attenuator dial reading must be doubled to give the correct "hard" microvolt reading.

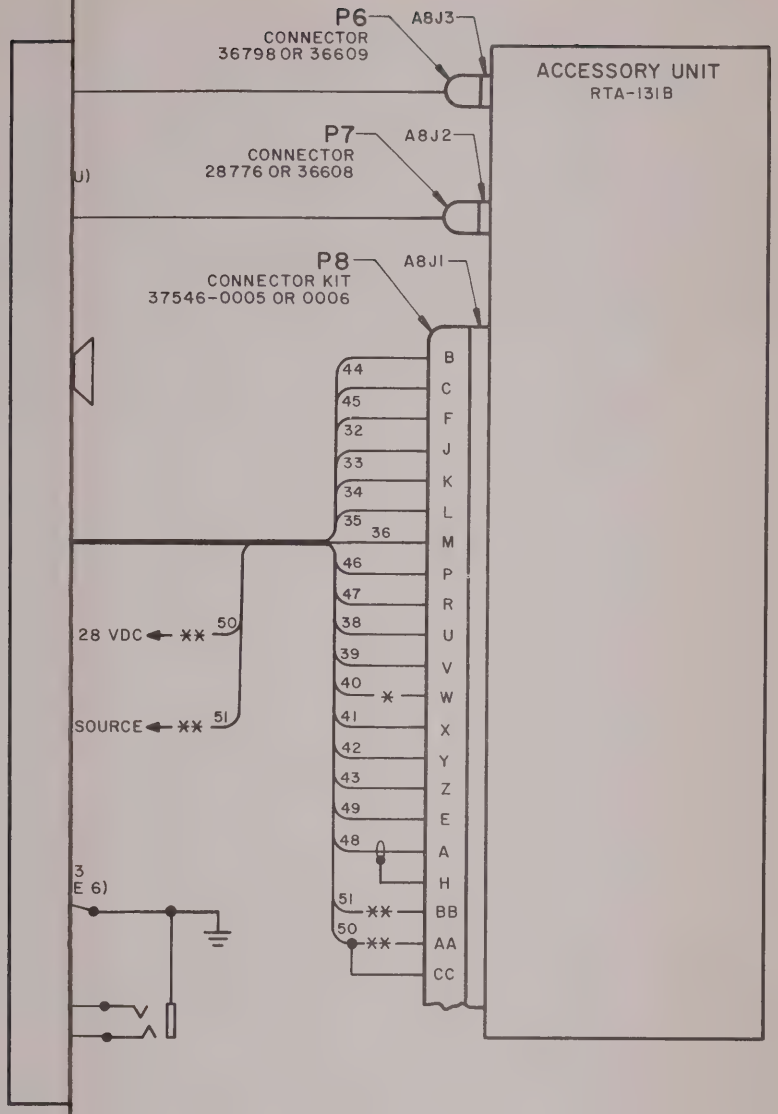
If the transmitter is keyed while a signal generator is connected to antenna connector A8J4 of the accessory unit, the internal impedance resistor in the signal generator will be damaged. To prevent accidental damage to the signal generator during prolonged testing, the signal generator input may be connected directly to receiver r-f input A5J5 of the receiver-transmitter. However, allowance must be made for the 3-dB signal difference because of the omission of the bandpass filter in the receiver input circuit.

Transmitter Load. During all transmitter testing, the Bird Electronic Model 43 Thruline Wattmeter and Empire Devices Model AT-70 Attenuator (or an equivalent 50-ohm dummy load) must be connected to antenna connector A8J4 of the accessory unit.

Shield Covers. The three subassemblies of r-f assembly A1 of the receiver-transmitter are enclosed in a common shield cover. Removal of the shield cover causes a slight detuning of the r-f circuit and causes extensive variation in the balanced mixer output. Access holes are provided in the side plate of the receiver-transmitter subassembly and in the shield cover of A1 for adjusting the balanced mixer circuit. For optimum mixer adjustment, the cover must be in place during adjustments.

Transmitter amplifier assembly A1 of the accessory unit is enclosed in a shield cover. The use of a perforated shield cover is recommended during transmitter alignment (paragraph 5–16) but is not absolutely necessary.

[1] A "hard" microvolt is defined as an equivalent open-circuit microvolt across a 50-ohm signal source when connected to a 50-ohm load.



CABLE ASSEMBLIES, SEE FIGURES 5–3 AND 5–6.

UNMARKED WIRES ARE NO. 22 AWG. WIRES MARKED
WG. WIRES MARKED WITH A DOUBLE ASTERISK (**)
NO. 22 AWG WITH INSULATING JACKET.

SED TO DISABLE SQUELCH CIRCUIT DURING TESTING.

NT MEASUREMENT POINTS:
MPLIFIER
SELF-TEST CIRCUIT
PUT
NPUT

USED TO SELECT HEADSET OR SPEAKER OPERATION.

USED FOR KEYING TRANSMITTER. IF THE USE OF A
RED, ATTACH WIRES 48 AND 49 TO MICROPHONE JACK.

4945

Figure 5–1. 131B Communication Set, Bench Test Cable Assemblies, Wiring Diagram

Replacement of Frequency Synthesizer. Frequency synthesizer A4 of the receiver-transmitter is a sealed assembly which can be serviced only at factory-designated repair shops. Warranty for the assembly is void if the seal is broken. To replace the frequency synthesizer assembly, see Figure 6–2 and proceed as follows:

Step 1. Remove dust cover from receiver-transmitter; remove two screws from rear cover and remove cover.

Step 2. Remove two screws that hold plate assembly of A3 to rear of chassis.

Step 3. From top side of unit, remove hexagonal post located between assemblies A1 and A2.

Step 4. Through hole in front left-hand corner of the printed circuit board of A2, remove screw and spacer that hold A4.

Step 5. Remove four screws, two from the top and two from the bottom, that hold the receiver-transmitter subassembly to the front of the chassis.

Step 6. Lift receiver-transmitter subassembly away from chassis, disconnecting A3P1 from A5J1.

Step 7. Disconnect A4P3 from A1A3J1.

Step 8. Using Cannon CET-C6B contact removal tool, remove coaxial contact A1 from connector A3P1.

Step 9. Disconnect A5P2 from A4J1.

Step 10. Remove three flat-head screws that hold A4 to the right side plate of the subassembly.

Step 11. Unsolder interconnecting wires and remove frequency synthesizer.

Step 12. To install replacement assembly, refer to Figure 6–2 for wiring information and reverse procedures of Steps 1 through 11.

5–4. GENERAL BENCH TEST INFORMATION.

Interconnection of Units of 131B Set. Bench test cable assemblies (not supplied) must be fabricated to interconnect the units of the 131B for bench testing. The cable assemblies shown in Figure 5–1 are recommended since they provide convenient test connections and a squelch disable switch. The tests described in this section refer to the use of these cable assemblies.

Interconnection of 131B and Test Equipment. Interconnecting cables between the 131B and the test equipment (when not supplied as test equipment accessories) are fabricated as required from RG-58/U coaxial cable and suitable connectors. A linear detector (see Figure 5–2) must also be fabricated.

Test Conditions. For bench testing the 131B, the following test conditions apply, unless otherwise specified.

Input Power. Input power for the 131B is 1.5 amperes at 27.5 volts dc for receive and 6.5 amperes at 27.5 dc for transmit, supplied from a regulated dc power supply.

Phone Output. Phone output is the audio signal supplied from the receiver through the volume control on the control unit measured across a 250-ohm load.

Signal Generator Output. Use care in connecting the units of the 131B and the signal generator to ensure proper interpretation of results. All of the signal generator output-microvolt values given in the procedures in this section are in terms of "hard" (open-circuit) microvolts.[1] When the Hewlett-Packard 00505B Attenuator (6-dB pad) is used, the attenuator dial of the signal generator reads "hard" microvolts directly. If the signal generator output is connected to the receiver without a 6-dB pad, the attenuator dial reading must be doubled to give the correct "hard" microvolt reading.

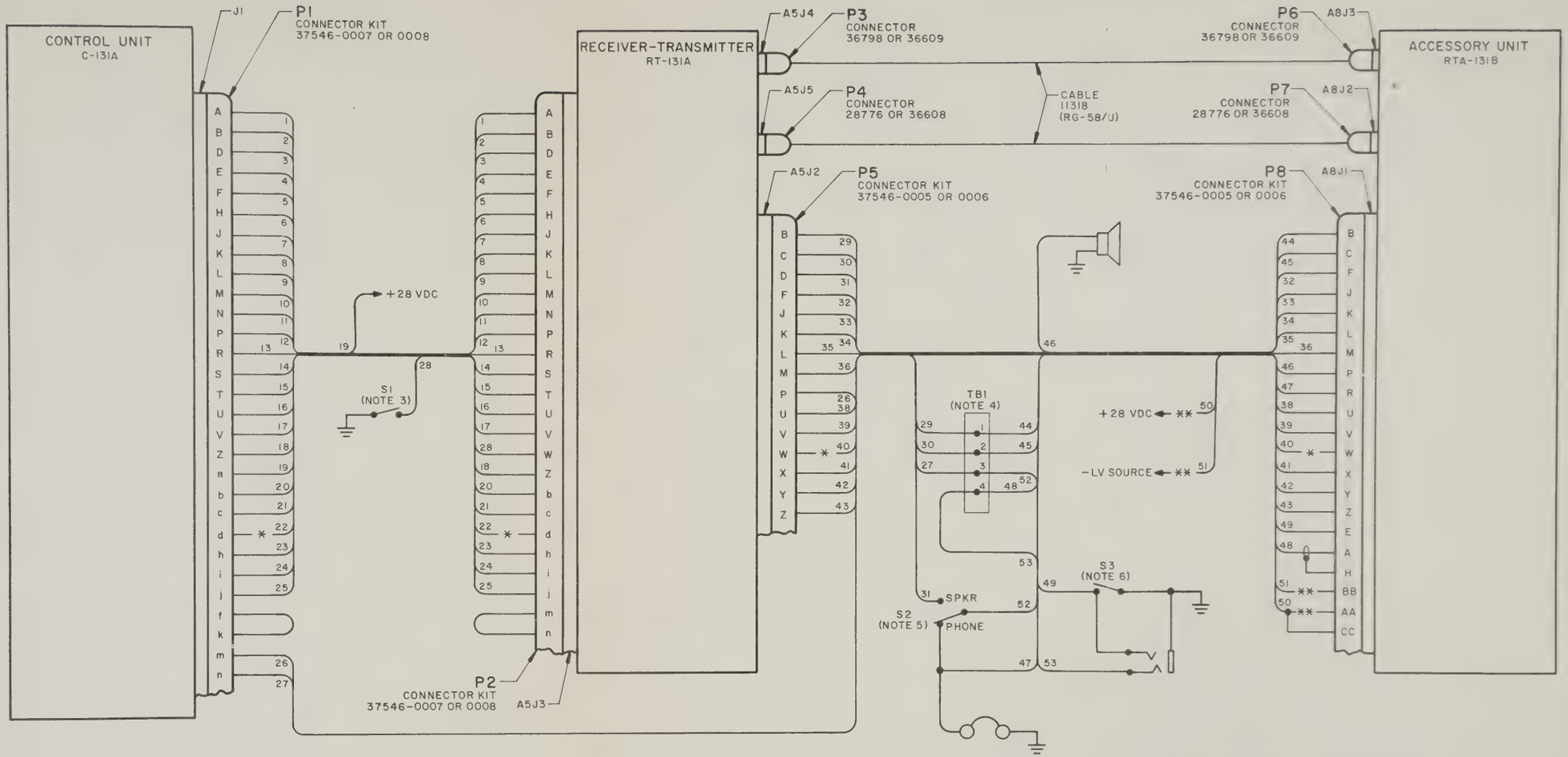
If the transmitter is keyed while a signal generator is connected to antenna connector A8J4 of the accessory unit, the internal impedance resistor in the signal generator will be damaged. To prevent accidental damage to the signal generator during prolonged testing, the signal generator input may be connected directly to receiver r-f input A5J5 of the receiver-transmitter. However, allowance must be made for the 3-dB signal difference because of the omission of the bandpass filter in the receiver input circuit.

Transmitter Load. During all transmitter testing, the Bird Electronic Model 43 Thruline Wattmeter and Empire Devices Model AT-70 Attenuator (or an equivalent 50-ohm dummy load) must be connected to antenna connector A8J4 of the accessory unit.

Shield Covers. The three subassemblies of r-f assembly A1 of the receiver-transmitter are enclosed in a common shield cover. Removal of the shield cover causes a slight detuning of the r-f circuit and causes extensive variation in the balanced mixer output. Access holes are provided in the side plate of the receiver-transmitter subassembly and in the shield cover of A1 for adjusting the balanced mixer circuit. For optimum mixer adjustment, the cover must be in place during adjustments.

Transmitter amplifier assembly A1 of the accessory unit is enclosed in a shield cover. The use of a perforated shield cover is recommended during transmitter alignment (paragraph 5–16) but is not absolutely necessary.

[1] A "hard" microvolt is defined as an equivalent open-circuit microvolt across a 50-ohm signal source when connected to a 50-ohm load.



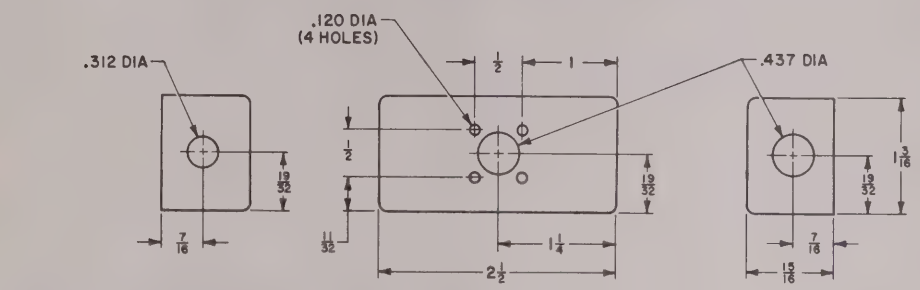
NOTES:

1. FOR TYPICAL INTERCONNECTION OF CABLE ASSEMBLIES, SEE FIGURES 5–3 AND 5–6.
2. ALL WIRES ARE STRANDED COPPER. UNMARKED WIRES ARE NO. 22 AWG. WIRES MARKED WITH AN ASTERISK (*) ARE NO. 18 AWG. WIRES MARKED WITH A DOUBLE ASTERISK (**) ARE NO. 16 AWG. SHIELDED WIRES ARE NO. 22 AWG WITH INSULATING JACKET.
3. SWITCH S1 IS A SPST TOGGLE SWITCH USED TO DISABLE SQUELCH CIRCUIT DURING TESTING.
4. TERMINALS ON TB1 PROVIDE CONVENIENT MEASUREMENT POINTS:
   TERMINAL 1—INPUT TO SPEAKER AMPLIFIER
   TERMINAL 2—TEST AUDIO INPUT TO SELF-TEST CIRCUIT
   TERMINAL 3—RECEIVER PHONE OUTPUT
   TERMINAL 4—MICROPHONE AUDIO INPUT
5. SWITCH S2 IS A SPDT TOGGLE SWITCH USED TO SELECT HEADSET OR SPEAKER OPERATION.
6. SWITCH S3 IS A SPST TOGGLE SWITCH USED FOR KEYING TRANSMITTER. IF THE USE OF A MICROPHONE FOR TESTING IS PREFERRED, ATTACH WIRES 48 AND 49 TO MICROPHONE JACK.

4945

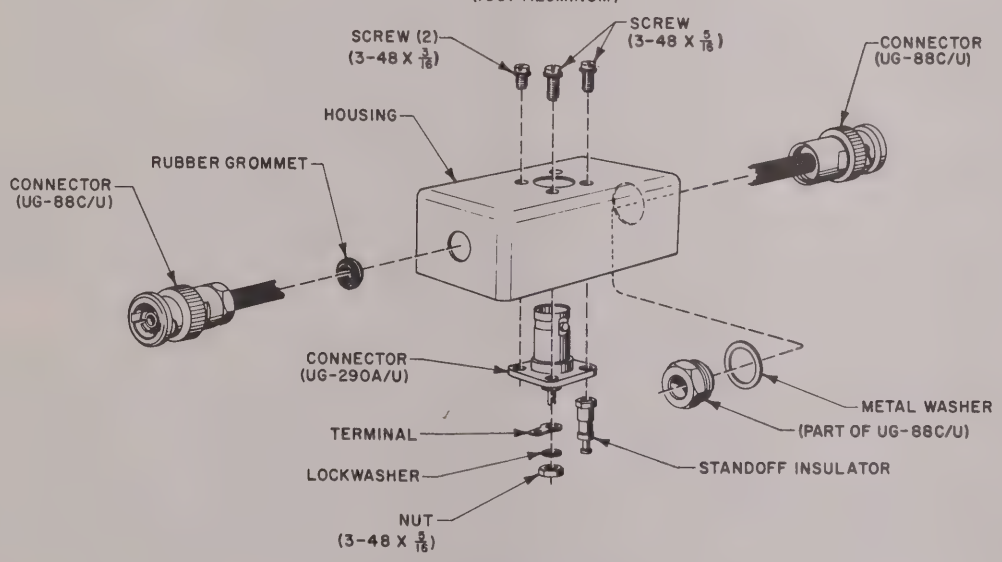
Figure 5–1. 131B Communication Set, Bench Test Cable Assemblies, Wiring Diagram

LINEAR DETECTOR

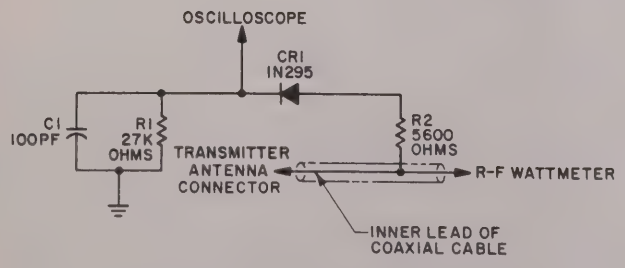


NOTE: DIMENSIONS ARE IN INCHES.

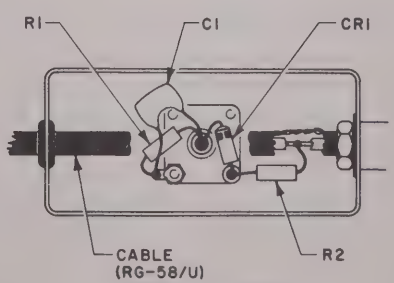
TYPICAL HOUSING
(.031 ALUMINUM)



ASSEMBLY DETAILS



SCHEMATIC DIAGRAM



WIRING DIAGRAM

1545-1

Figure 5–2. Linear Detector For Bench Test Setup

5–5. EQUIPMENT PERFORMANCE AND TROUBLE ANALYSIS.

General. Table 5–3 outlines the procedures for checking performance and troubleshooting the communication set. The tests required to check a circuit are grouped together and identified under a subtitle. The steps of a circuit test should be performed in the order listed as some steps presuppose previous satisfactory results. Primary steps, identified by numerals, must be performed. Secondary steps, identified by an alphanumerical combination, such as 4A, 4B, need not be performed unless an abnormal indication is obtained in the primary step and further testing is required to localize the trouble. This information should be supplemented by referring to the schematic and wiring diagrams in Section 6. The general information in paragraph 5–4 applies to the procedures in Table 5–3.

Test Points. All test points referred to in Table 5–3 are in the receiver-transmitter and the accessory unit. These test points are not stamped on the units; to locate them, remove the dust covers from the units and see Figures 5–4 and 5–5.

Voltage Measurements. Voltage values specified in Table 5–3 and on Figures 6–1 and 6–4 are typical and are subject to variation. Controlling factors are the test interconnections, primary input voltage, and selected components in individual units.

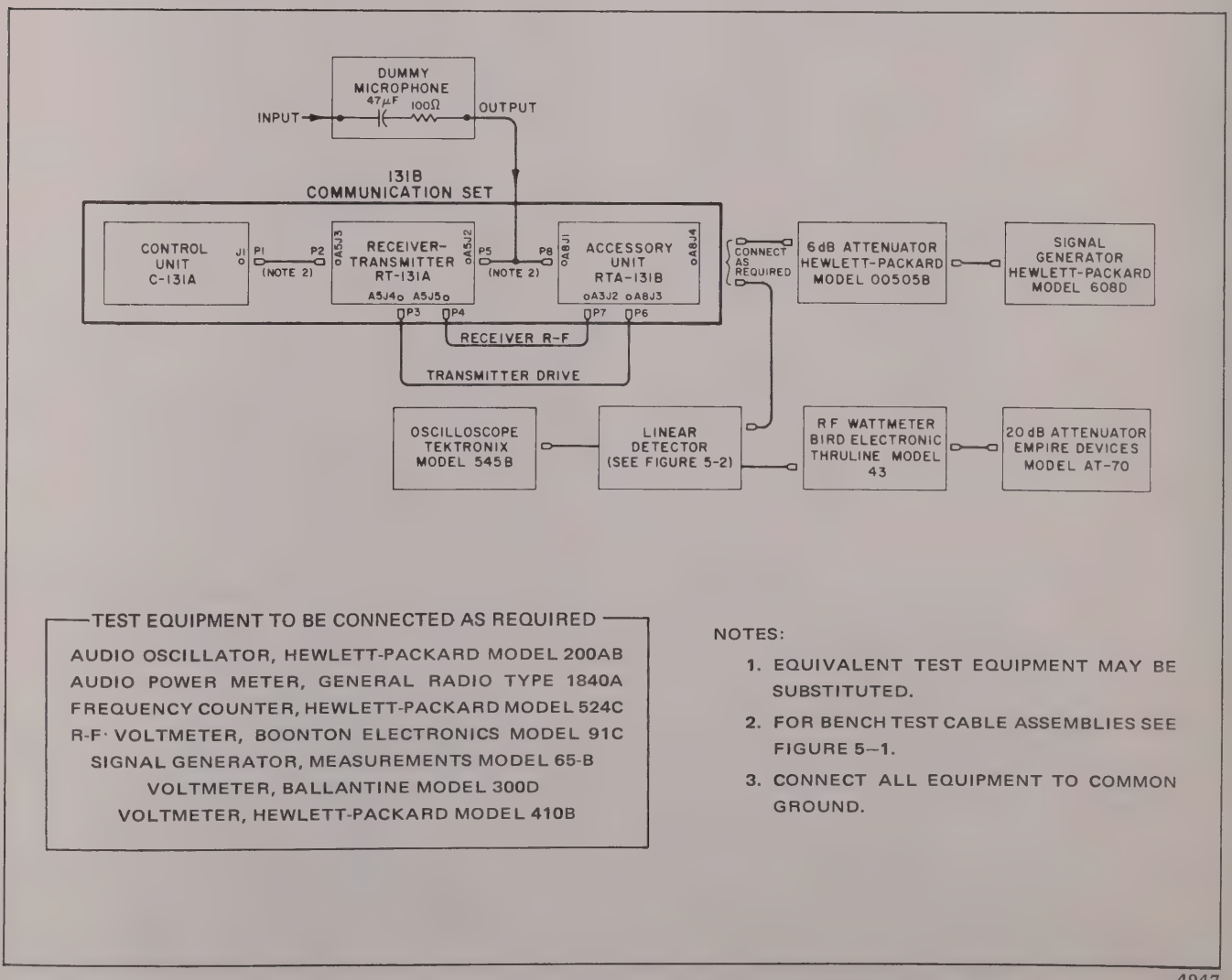


Figure 5–3. 131B Communication Set, General Bench Test Interconnection Diagram

TABLE 5–3. EQUIPMENT PERFORMANCE AND TROUBLE ANALYSIS

Step	Procedure	Normal Indication	Possible Cause of Abnormal Indication
	PRELIMINARY PROCEDURE		
1	Interconnect communication set and test equipment as shown in Figure 5–3.	None	–
2	Apply power to test equipment and low-voltage source; allow to warm up. Adjust low-voltage source for 27.5 volts dc output.	–	–
3	Turn on communication set.	Panel lamps on control unit light.	Defective switch, panel lamps.
4	Connect dc probe of Hewlett-Packard Model 410B vtvm to terminal A5E10 in receiver-transmitter.	Model 410B indicates 17 ±0.5 volts dc.	Defective 17-volt regulator circuit in accessory unit.
5	Connect dc probe of 410B to red terminal (20 Vdc) on frequency synthesizer in receiver-transmitter.	Model 410B indicates 20 ±0.5 volts dc.	Defective 20-volt regulator circuit in accessory unit.
6	Connect dc probe of 410B to terminal K of A3 in receiver-transmitter.	Model 410B indicates 15 ±0.5 volts dc.	Defective 15-volt switch circuit in regulator assembly A3 of receiver-transmitter.
7	Connect dc probe of 410B to junction of A8R7 and terminal V of A8J1 in accessory unit.	Model 410B indicates 10 ±0.5 volts dc.	Defective resistor A8R7 or fuse A8F1.
8	Connect dc probe of 410B to white terminal (5 Vdc) of frequency synthesizer in receiver-transmitter.	Model 410B indicates 5 ±0.25 volts dc.	Defective 5-volt regulator circuit in A3 of receiver-transmitter.
9	Connect Bird Electronics Model 43 Thruline Wattmeter and 50-ohm load to antenna connector A8J4 of accessory unit.	None	–
10	Connect dc probe of 410B to terminal 5 of modulation transformer A6T1. Key transmitter.	Model 410B indicates 14 volts dc.	Defective 15-volt regulator circuit or transient protector and power switch in A7; defective relay delay assembly A4A2; defective keying relay A8K2.
	RECEIVER CIRCUITS		
1	Perform preliminary procedure outlined previously in this table.	As noted.	As noted.
2	Connect Hewlett-Packard Model 608D Signal Generator through Hewlett-Packard Model 00505B Attenuator (6 dB) to antenna connector A8J4 of accessory unit. Set 608D for output signal of 2 μV at 118.000 MHz, with 30 percent modulation of 1000 Hz.	None.	–
3	Set MHz and FRACT MHz controls to 118.000 MHz.	None.	–

TABLE 5–3. EQUIPMENT PERFORMANCE AND TROUBLE ANALYSIS–Continued

Step	Procedure	Normal Indication	Possible Cause of Abnormal Indication
	RECEIVER CIRCUITS–Continued		
4	Connect Ballantine Model 300D vtvm to phone output (at speaker-phone switch, see Figure 5–1), and adjust volume control on control unit for an indication of 14 dB on the 1-volt scale of the 300D.	As noted.	–
5	Remove modulation from 608D.	Model 300D indicates drop of at least 6 dB. Drop in output is S+N/N ratio.	Defective or improperly adjusted receiver circuit. To isolate trouble, perform Steps 5A through 5N.
	Turn volume control fully clockwise, reset MHz and FRACT MHz controls to 126.500 MHz, and reset 608D for output signal of 100 μV at 126.500 MHz, with 30 percent modulation of 1000 Hz.	Model 300D indicates 5 volts ac. **Note** If normal indications are obtained, proceed to Step 6.	**Note** Advance attenuator of 608D to try to obtain output indication on 300D. If a high level is required to obtain output, check gain of Assembly A2 (Steps 5D through 5L). If no output is obtained at any level, check output of frequency synthesizer (Steps 5A and 5B).
5A	Connect probe of Boonton Electronics Model 91C R-f Voltmeter to A1A3TP1 (Figure 5–4) of the receiver-transmitter. On control unit, select all receiving frequencies between 118.000 and 135.975 MHz.	Model 91C indicates at least 0.6 volt for each frequency selected.	Defective frequency synthesizer A4.
5B	Disconnect 91C and connect Hewlett-Packard Model 524C Frequency Counter through a .01-μF capacitor to A1A3TP1. Select all receiving frequencies between 118.000 and 135.975 MHz.	Model 524C indicates frequency 21.025 MHz ±0.003 percent greater than selected frequency.	Defective frequency synthesizer A4.
5C	Disconnect 524C.	None.	–
5D	Connect Hewlett-Packard Model 200AB Audio Oscillator through a 1-μF capacitor to terminal 14 of assembly A2A7. Set 200AB for output of 30 mV at 1000 Hz.	Model 300D indicates 5 volts ac	Defective audio amplifier A2A7. If A2A7 is replaced, A2A5 must be readjusted (paragraph 5–12).
5E	Connect 200AB through 1-μF capacitor to terminal 13 of assembly A2A6, and reset 200AB for output of 58 mV at 1000 Hz.	Model 300D indicates 5 volts ac.	Defective squelch assembly A2A6. If A2A6 is replaced, A2A5 must be readjusted (paragraph 5–13).
5F	Connect 200AB through 1-μF capacitor to terminal 14 of assembly A2A5; reset 200AB for output of 60 mV at 1000 Hz.	Model 300D indicates 5 volts ac.	Defective audio compressor A2A5. If A2A5 is replaced, A2A5 must be readjusted (paragraph 5–12).

TABLE 5–3. EQUIPMENT PERFORMANCE AND TROUBLE ANALYSIS–Continued

Step	Procedure	Normal Indication	Possible Cause of Abnormal Indication
	RECEIVER CIRCUITS–Continued		
5G	Connect 200AB through 1-μF capacitor to terminal 6 of assembly A2A4; reset 200AB for output of 480 mV at 1000 Hz.	Model 300D indicates 5 volts ac.	Defective agc assembly A2A4. If A2A4 is replaced, squelch carrier adjust A2A4R8 and i-f gain adjust A2A1R11 must be readjusted.
5H	Disconnect 200AB, and connect Measurements Model 65-B Signal Generator directly to terminal 14 of assembly A2A3. Set 65-B for output of 270 μV at 4.22 MHz, with 30 percent modulation of 1000 Hz.	Model 300D indicates 5 volts ac.	Defective second i-f amplifier A2A3. If A2A3 is replaced, i-f gain must be readjusted (paragraph 5–11).
5J	Connect 65-B directly to terminal 6 of assembly A2A2; reset 65-B for output of 65 μV at 23.025 MHz, with 30 percent modulation of 1000 Hz.	Model 300D indicates 5 volts ac.	Defective second mixer A2A2. If A2A2 is replaced, i-f gain (paragraph 5–11) and squelch carrier adjust A2A4R8 must be readjusted.
5K	Connect 65-B directly to terminal 14 of assembly A2A1; reset 65-B for output of 10 μV at 23.025 MHz, with 30 percent modulation of 1000 Hz.	Model 300D indicates 5 volts ac.	Defective first i-f amplifier A2A1. If A2A1 is replaced, i-f gain must be readjusted (paragraph 5–11).
5L	Connect 65-B through a 560-ohm resistor to input of A2Z1. Reset 65-B for output of 17 μV at 23.025 MHz, with 30 percent modulation of 1000 Hz.	Model 300D indicates 5 volts ac.	Defective crystal filter A2Z1.
5M	Disconnect 65-B and connect 608D directly to input of A1A3C1 (Figure 5–4). Set 608D for output of 16 μV at 126.500 MHz, with 30 percent modulation of 1000 Hz.	Model 300D indicates 5 volts ac.	Defective or improperly adjusted balanced mixer A1A3 (paragraph 5–10).
5N	Connect 608D through Hewlett-Packard Model 355A Attenuator (9 dB) to receiver r-f in A5J5. Set 608D for output of 5 μV at 126.500 MHz, with 30 percent modulation of 1000 Hz.	Model 300D indicates 5 volts ac.	Defective r-f amplifier circuit A1A2.
6	Connect 608D through 6 dB attenuator to antenna connector A8J4. Set 608D for output of 3 μV at 126.500 MHz, with 30 percent modulation of 1000 Hz.	None.	–
7	Close squelch disable switch (Figure 5–1).	Audio output signal is indicated on 300D.	Defective squelch circuit.
8	Disconnect test equipment.	–	–
	TRANSMITTER CIRCUITS		
1	Perform preliminary procedure outlined previously in this table.	As noted.	As noted.

TABLE 5–3. EQUIPMENT PERFORMANCE AND TROUBLE ANALYSIS–Continued

Step	Procedure	Normal Indication	Possible Cause of Abnormal Indication
	TRANSMITTER CIRCUITS–Continued		
2	As shown in Figure 5–3, connect Bird Electronic Thruline Model 43 Wattmeter through linear detector to antenna connector A8J4 of accessory unit. Connect Tektronix Model 545B Oscilloscope to side port of linear detector.	–	–
3	Connect Hewlett-Packard Model 200AB Audio Oscillator through dummy microphone to mike audio input (A, A8J1). Adjust 200AB for output of 1000 Hz at 1 volt.	–	–
4	Set MHz and FRACT MHz controls to 118.000, 126.500, and 135.975 MHz in succession. Key transmitter at each frequency selected.	Model 43 indicates at least 16 watts for each selected frequency. Model 545B indicates at least 85 percent modulation.	Defective transmitter circuit; to isolate trouble, proceed with Steps 5–13.
	Increase output of 200AB to 2.5 volts, and recheck transmitter output at 118.000, 126.500, and 135.975 MHz.	Model 545B indicates greater than 85 but not more than 100 percent modulation. **Note** If normal indications are obtained, disconnect test equipment and omit remaining steps of this procedure.	–
5	Disconnect transmitter drive out cable from A5J4 of the receiver-transmitter and connect a 50-ohm load (50-ohm resistor) across A5J4. Connect Boonton Electronics Model 91C R-f Voltmeter across 50-ohm load.	–	–
6	Set MHz and FRACT MHz controls to 118.000 126.500, and 135.975 MHz in succession. Key transmitter at each frequency selected.	Model 91C indicates at least 0.6 volt for each frequency selected.	Defective frequency synthesizer.
7	Disconnect 91C and 50-ohm load.	–	–
8	Disconnect A8P2 from A1J3. Readjust 200AB for output of 1 volt at 1000 Hz. Connect General Radio Type 1840-A Audio Power Meter to terminal 5 of audio transformer A6T1. Set A6A1R4 fully clockwise; key transmitter.	Type 1840-A indicates approximately 20 watts.	Defective modulator-amplifier A6.
9	Disconnect 200AB and reconnect A8P2 to A1J3. In succession, connect dc probe of Hewlett-Packard Model 410B vtvm to collector of A1Q1, A1Q2, and A1Q3, keying transmitter at each connection.	Model 410B indicates 13 volts dc.	Defective transistor or circuit component.

TABLE 5–3. EQUIPMENT PERFORMANCE AND TROUBLE ANALYSIS–Continued

Step	Procedure	Normal Indication	Possible Cause of Abnormal Indication
	TRANSMITTER CIRCUITS–Continued		
10	In succession, connect dc probe of 410B to collector of A1Q4, A1Q5, and A1Q6, keying transmitter at each connection.	Model 410B indicates 14 volts dc.	Defective transistor or circuit component.
11	Reconnect transmitter drive out cable to A5J4. Connect dc probe of 410B to "forward" terminal of harmonic filter and SWR detector A2 and key transmitter.	Model 410B indicates approximately 4 volts dc.	Defective harmonic filter and SWR detector assembly.
12	Connect dc probe of 410B to "reverse" terminal of harmonic filter and SWR detector A2 and key transmitter.	Model 410B indicates less than 0.5 volt dc.	Defective harmonic filter and SWR detector A2.
13	Disconnect test equipment.	–	–
	MODULATOR-AMPLIFIER CIRCUIT		
1	Perform preliminary procedure, receiver circuit checks, and transmitter circuits checks outlined previously in this table.	As noted.	As noted.
2	Set A8R6 fully clockwise. Connect Hewlett-Packard Model 200AB Audio Oscillator to speaker amplifier in (A8J1, terminal B) of accessory unit. Connect General Radio Type 1840-A Audio Power Meter across 4-ohm speaker. Adjust 200AB for output at 1000 Hz sufficient to produce a 10-watt indication on 1840-A.	As noted.	Defective assembly A6.
3	Connect probe of Ballantine Model 300D vtvm to terminal 8 of audio switch A6A2.	Model 300D indicates approximately 120 mV ac.	Defective wiring in unit.
4	Connect 300D to terminal 2 of A6A2.	Model 300D indicates approximately 110 mV ac.	Defective audio switch A6A2.
5	Connect 300D to base of A6Q1 and then to base of A6Q2.	Model 300D indicates approximately 650 mV ac at each point.	Defective audio amplifier A6A3.
6	Connect 300D to collector of A6Q1 and then to collector of A6Q2.	Model 300D indicates approximately 10 volts ac at each point.	Defective transistor or circuit component.
7	Connect 200AB to mike audio input (A8J1, terminal A); connect 1840-A across terminals 6 and 7 of A6T1. Remove transmitter drive input from connector A8J3, and set A6A1R4 and A6A1R5 fully clockwise. Key transmitter, and adjust 200AB for a 10-watt indication on 1840-A.	As noted.	–

TABLE 5–3. EQUIPMENT PERFORMANCE AND TROUBLE ANALYSIS–Continued

Step	Procedure	Normal Indication	Possible Cause of Abnormal Indication
	MODULATOR-AMPLIFIER CIRCUIT–Continued		
8	Connect 300D to terminal 7 of audio limiter A6A1. Key transmitter.	Model 300D indicates approximately 210 mV ac.	Defective wiring in unit.
9	Connect 300D to terminal 13 of A6A1. Key transmitter.	Model 300D indicates approximately 120 mV ac.	Defective audio limiter A6A1.
10	Connect 300D to terminal 2 of audio switch A6A2. Key transmitter.	Model 300D indicates approximately 110 mV ac.	Defective audio switch A6A2.
11	Connect 300D to base of A6Q1 and then to base of A6Q2. Key transmitter.	Model 300D indicates approximately 650 mV ac at each point.	Defective audio amplifier A6A3.
12	Connect 300D to collector of A6Q1 and then to collector of A6Q2. Key transmitter.	Model 300D indicates approximately 10 volts ac at each point.	Defective transistor or circuit component.
13	Connect 300D to terminal 5 of A6T1. Key transmitter.	Model 300D indicates approximately 6.5 volts ac.	Defective transformer A6T1.
14	Refer to paragraph 5–14 and readjust A6A1R4 and A6A1R5.	As noted.	–
15	Disconnect test equipment.	–	–
	SELF-TEST CIRCUITS		
1	Perform preliminary procedure outlined previously in this table.	As noted.	As noted.
2	Interconnect the 131B as shown in Figure 5–1 and apply power.	–	–
3	To check the receiver self-test circuits, hold the R/T TEST switch on the control unit in the R position and make the following voltage measurements:	–	–
	a. Connect probe of Ballantine Model 300D vtvm to terminal N of regulator assembly A3 in receiver-transmitter.	Model 300D indicates at least 2.0 volts ac.	Defective self-test assembly A1A1 in the receiver-transmitter.
	b. Connect dc probe of Hewlett-Packard Model 410B vtvm to terminal A of assembly A3.	Model 410B indicates 17 volts dc.	Defective R/T TEST switch in control unit; defective 17-volt circuit.
	c. Connect dc probe of 410B to terminal P of assembly A3.	Model 410B indicates 13 volts dc.	Improper adjustment of receiver self-test level control A1A1R3; low receiver gain.
	d. Connect dc probe of 410B to terminal G of assembly A3.	Model 410B indicates 4 volts dc.	Defective flasher circuit.

TABLE 5–3. EQUIPMENT PERFORMANCE AND TROUBLE ANALYSIS–Continued

Step	Procedure	Normal Indication	Possible Cause of Abnormal Indication
	SELF-TEST CIRCUITS–Continued		
4	To check transmitter self-test circuits, connect 50-ohm load to antenna connector A8J4 of the accessory unit, hold the R/T TEST switch on the control unit in the T position and make the following voltage measurements:	–	–
	a. Connect 300D to terminal 13 of transient protector power switch A7 in accessory unit.	Model 300D indicates 1.8 volts ac.	Defective self-test assembly A1A1 in the receiver-transmitter; improperly adjusted self-test audio adjust A3R23.
	b. Connect dc probe of 410B to terminal 13 of signal sensor A4A1 in accessory unit.	Model 410B indicates 10 volts dc.	Improperly adjusted self-test audio adjust A7R19; defective signal sensor assembly A4A1.
	c. Connect dc probe of 410B to terminal H of regulator assembly A3 in receiver-transmitter.	Model 410B indicates 10 volts dc.	Defective self-test circuits in accessory unit; defective transmitter circuit.
5	Disconnect test equipment	–	–

5–6. GENERAL ALIGNMENT AND ADJUSTMENT INFORMATION.

Paragraph 5–7 describes the measurement and adjustment of the operating voltage outputs in both the receiver-transmitter and the accessory unit. Paragraph 5–8 describes the frequency synthesizer output measurements. The measurements and adjustments of paragraphs 5–7 and 5–8 should be made before any other alignment or adjustment procedures are performed.

Paragraphs 5–9 through 5–13 describe the measurement and adjustment procedures for the other circuits of the receiver-transmitter; Figure 5–4 locates and identifies the adjustment and test points. Paragraphs 5–14 through 5–16 describe the alignment and adjustment procedures for the accessory unit; Figures 5–5 and 5–6 locate and identify the alignment, adjustment, and test points. Paragraph 5–17 describes the adjustment procedures for both the receiver and the transmitter self-test circuits.

The information in paragraph 5–4 applies to all procedures in paragraphs 5–7 through 5–17. After an alignment or adjustment procedure has been completed, equipment performance should be checked as described in paragraph 5–5 and outlined in Table 5–3.

5–7. OPERATING VOLTAGE MEASUREMENTS AND ADJUSTMENTS.

Measure and adjust the operating voltages in the accessory unit and the receiver-transmitter as follows:

Step 1. Interconnect 131B as shown in Figure 5–1 and apply power.

Step 2. Connect dc probe of Hewlett-Packard Model 410B vtvm to emitter circuit of A8Q1 in the accessory unit (Figure 5–5).

Step 3. Adjust A5R7 as necessary to obtain an indication of 20 volts on the 410B.

Step 4. Reconnect dc probe of 410B to emitter circuit of A8Q2.

Step 5. Adjust A5R15 as necessary to obtain an indication of 17 volts on the 410B.

Step 6. Reconnect dc probe of 410B to junction of A8R7 and terminal V of A8J1. The 410B should indicate 10 ±1 volts.

Step 7. Reconnect dc probe of 410B to +5V input of frequency synthesizer A4 in the receiver-transmitter.

Step 8. Adjust A3R17 in the receiver-transmitter as necessary to obtain an indication of 5 ±0.25 volts on 410B.

Step 9. Reconnect dc probe of 410B to terminal 5 of modulation transformer A6T1 of the accessory unit.

Step 10. Key transmitter and adjust A7R13 (Figure 5–5) in the accessory unit as necessary to obtain an indication of 14 volts on 410B.

5–8. FREQUENCY SYNTHESIZER A4 OUTPUT MEASUREMENTS.

Before checking and adjusting the other assemblies of the receiver-transmitter and of the accessory unit, the outputs of the frequency synthesizer should be checked as follows:

CAUTION

Frequency synthesizer assembly A4 is a sealed unit which has been preadjusted at the factory and which can be serviced only at factory-designated repair stations. Warranty is void if seal is broken.

Step 1. Interconnect 131B as shown in Figure 5–1 and apply power.

Step 2. Connect a 50-ohm load (50-ohm resistor) to transmitter drive out connector A5J4 of the receiver-transmitter. Connect Hewlett-Packard Model 524 Frequency Counter across 50-ohm load.

Step 3. Rotate MHz and FRACT MHz controls from 118.000 to 135.975 MHz, keying transmitter at each frequency selected. Frequency indicated on 524 should be within ±0.003 percent of frequency selected.

Step 4. Through hole in shield cover, connect Boonton Electronics Model 91C R-f Voltmeter to A1A3TP1 (Figure 5–4).

Step 5. Rotate MHz and FRACT MHz controls from 118.000 to 135.975 MHz. Check that voltage indicated on 91C is at least 0.6 volt rms for each frequency selected.

Step 6. Disconnect 91C, and reconnect 524 through a .01 μF capacitor to A1A3TP1.

Step 7. Rotate MHz and FRACT MHz controls from 118.000 MHz to 135.975 MHz. Frequency indicated on 524 should be 21.025 MHz ±0.003 percent greater than selected frequency.

5–9. ADJUSTMENT OF SECOND MIXER–OSCILLATOR A2A2.

Adjust second mixer-oscillator A2A2 of the receiver-transmitter as follows:

Step 1. Interconnect 131B as shown in Figure 5–1 and apply power.

Step 2. Connect Boonton Electronics Model 91C R-f Voltmeter to terminal 14 of A2A2 (see Figure 5–4).

Step 3. Adjust 27.245 MHz oscillator output adjust A2A2C11 for maximum output on 91C.

5–10. ADJUSTMENT OF BALANCED MIXER A1A3.

Adjust balanced mixer A1A3 of the receiver-transmitter as follows:

Step 1. Interconnect 131B as shown in Figure 5–1 and apply power.

Step 2. Connect Hewlett-Packard Model 608D Signal Generator output through Hewlett-Packard Model 00505B Attenuator (6 dB) to antenna connector A8J4 of the accessory unit. Adjust 608D for output signal at 126.500 MHz with 30 percent modulation of 1000 Hz.

Step 3. Set MHz and FRACT MHz controls to 126.500 MHz.

Step 4. Connect Ballantine Model 300D vtvm to terminal 6 (detector output) of A2A4 of the receiver-transmitter.

Step 5. Adjust output signal level of 608D to provide an audio output indication on 300D.

Step 6. Through holes in shield cover adjust A1A3R1 and A1A3C10 for maximum indication on 300D.

Step 7. Reset MHz and FRACT MHz controls to 118.000 MHz and readjust 608D for output signal of 2 μV at 118.000 MHz.

Step 8. Reconnect 300D to phone output (arm of speaker-phone switch) and note output voltage indicated on 300D.

Step 9. Readjust 608D for output signal at 129.513 MHz and increase attenuator setting of 608D by approximately 60 dB.

Step 10. Connect Boonton Electronics 91C R-f Voltmeter to A1A3TP1 to monitor frequency synthesizer output.

Step 11. Adjust A1A3R3 and A1A3C9 for minimum indication on 300D (phone output). Make certain that frequency synthesizer output indicated on 91C does not go below 0.6 volt due to adjustment of A1A3R3.

5–11. ADJUSTMENT OF RECEIVER I-F GAIN.

To adjust the gain of the receiver i-f circuits, proceed as follows:

Step 1. Interconnect 131B as shown in Figure 5–1 and apply power.

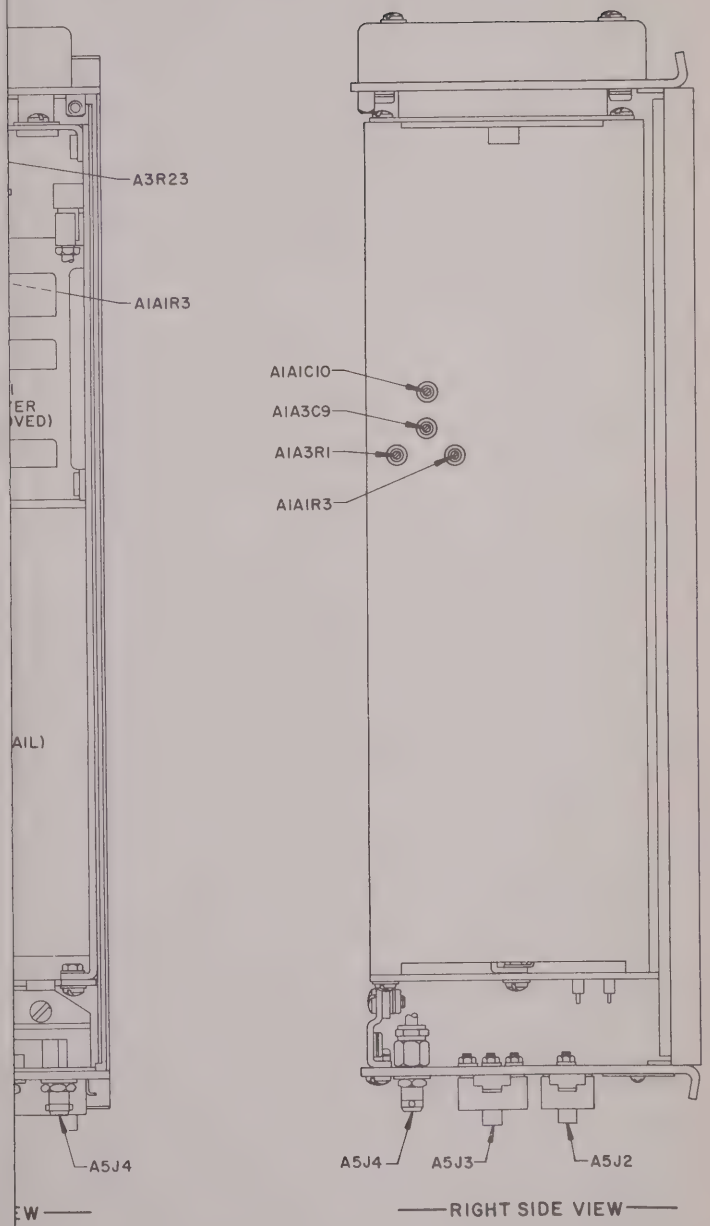


Figure 5–4. RT-131A Receiver-Transmitter, Adjustment and Test Point Location Diagram

Step 8. Adjust A3R17 in the receiver-transmitter as necessary to obtain an indication of 5 ±0.25 volts on 410B.

Step 9. Reconnect dc probe of 410B to terminal 5 of modulation transformer A6T1 of the accessory unit.

Step 10. Key transmitter and adjust A7R13 (Figure 5–5) in the accessory unit as necessary to obtain an indication of 14 volts on 410B.

5–8. FREQUENCY SYNTHESIZER A4 OUTPUT MEASUREMENTS.

Before checking and adjusting the other assemblies of the receiver-transmitter and of the accessory unit, the outputs of the frequency synthesizer should be checked as follows:

CAUTION

Frequency synthesizer assembly A4 is a sealed unit which has been preadjusted at the factory and which can be serviced only at factory-designated repair stations. Warranty is void if seal is broken.

Step 1. Interconnect 131B as shown in Figure 5–1 and apply power.

Step 2. Connect a 50-ohm load (50-ohm resistor) to transmitter drive out connector A5J4 of the receiver-transmitter. Connect Hewlett-Packard Model 524 Frequency Counter across 50-ohm load.

Step 3. Rotate MHz and FRACT MHz controls from 118.000 to 135.975 MHz, keying transmitter at each frequency selected. Frequency indicated on 524 should be within ±0.003 percent of frequency selected.

Step 4. Through hole in shield cover, connect Boonton Electronics Model 91C R-f Voltmeter to A1A3TP1 (Figure 5–4).

Step 5. Rotate MHz and FRACT MHz controls from 118.000 to 135.975 MHz. Check that voltage indicated on 91C is at least 0.6 volt rms for each frequency selected.

Step 6. Disconnect 91C, and reconnect 524 through a .01 μF capacitor to A1A3TP1.

Step 7. Rotate MHz and FRACT MHz controls from 118.000 MHz to 135.975 MHz. Frequency indicated on 524 should be 21.025 MHz ±0.003 percent greater than selected frequency.

5–9. ADJUSTMENT OF SECOND MIXER–OSCILLATOR A2A2.

Adjust second mixer-oscillator A2A2 of the receiver-transmitter as follows:

Step 1. Interconnect 131B as shown in Figure 5–1 and apply power.

Step 2. Connect Boonton Electronics Model 91C R-f Voltmeter to terminal 14 of A2A2 (see Figure 5–4).

Step 3. Adjust 27.245 MHz oscillator output adjust A2A2C11 for maximum output on 91C.

5–10. ADJUSTMENT OF BALANCED MIXER A1A3.

Adjust balanced mixer A1A3 of the receiver-transmitter as follows:

Step 1. Interconnect 131B as shown in Figure 5–1 and apply power.

Step 2. Connect Hewlett-Packard Model 608D Signal Generator output through Hewlett-Packard Model 00505B Attenuator (6 dB) to antenna connector A8J4 of the accessory unit. Adjust 608D for output signal at 126.500 MHz with 30 percent modulation of 1000 Hz.

Step 3. Set MHz and FRACT MHz controls to 126.500 MHz.

Step 4. Connect Ballantine Model 300D vtvm to terminal 6 (detector output) of A2A4 of the receiver-transmitter.

Step 5. Adjust output signal level of 608D to provide an audio output indication on 300D.

Step 6. Through holes in shield cover adjust A1A3R1 and A1A3C10 for maximum indication on 300D.

Step 7. Reset MHz and FRACT MHz controls to 118.000 MHz and readjust 608D for output signal of 2 μV at 118.000 MHz.

Step 8. Reconnect 300D to phone output (arm of speaker-phone switch) and note output voltage indicated on 300D.

Step 9. Readjust 608D for output signal at 129.513 MHz and increase attenuator setting of 608D by approximately 60 dB.

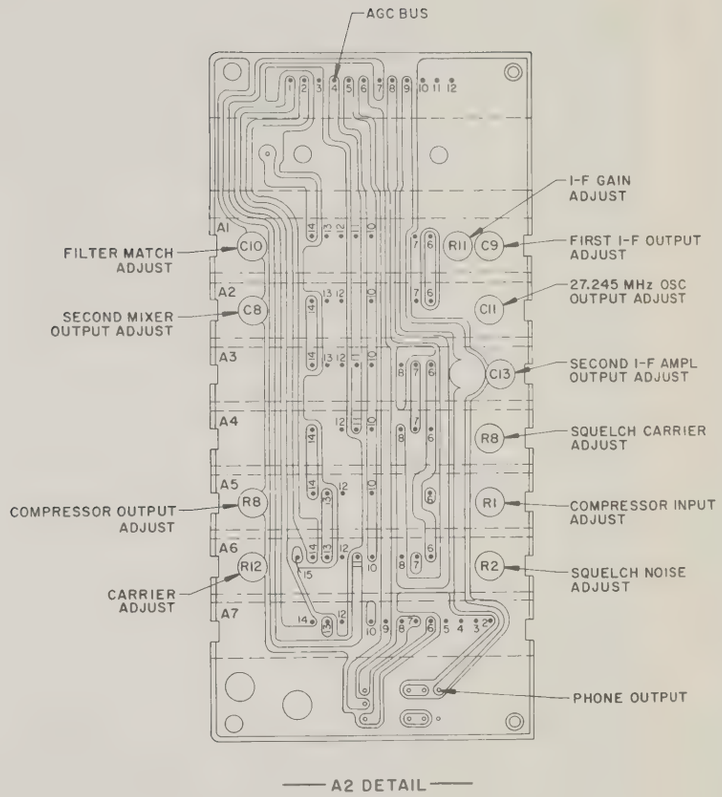
Step 10. Connect Boonton Electronics 91C R-f Voltmeter to A1A3TP1 to monitor frequency synthesizer output.

Step 11. Adjust A1A3R3 and A1A3C9 for minimum indication on 300D (phone output). Make certain that frequency synthesizer output indicated on 91C does not go below 0.6 volt due to adjustment of A1A3R3.

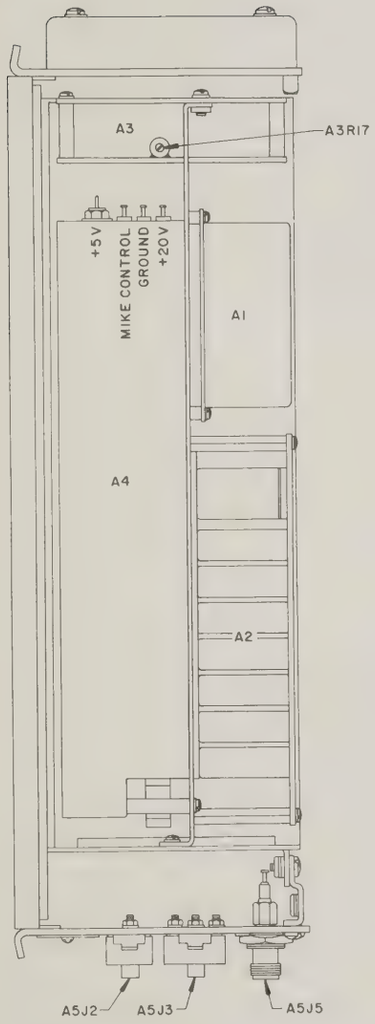
5–11. ADJUSTMENT OF RECEIVER I-F GAIN.

To adjust the gain of the receiver i-f circuits, proceed as follows:

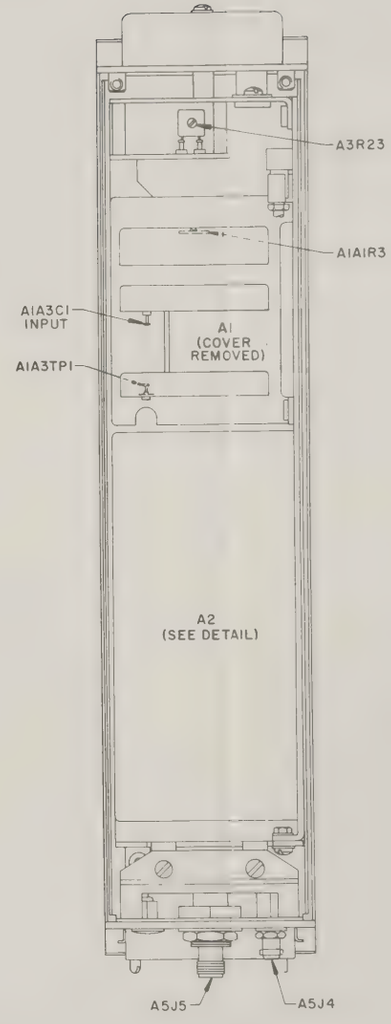
Step 1. Interconnect 131B as shown in Figure 5–1 and apply power.



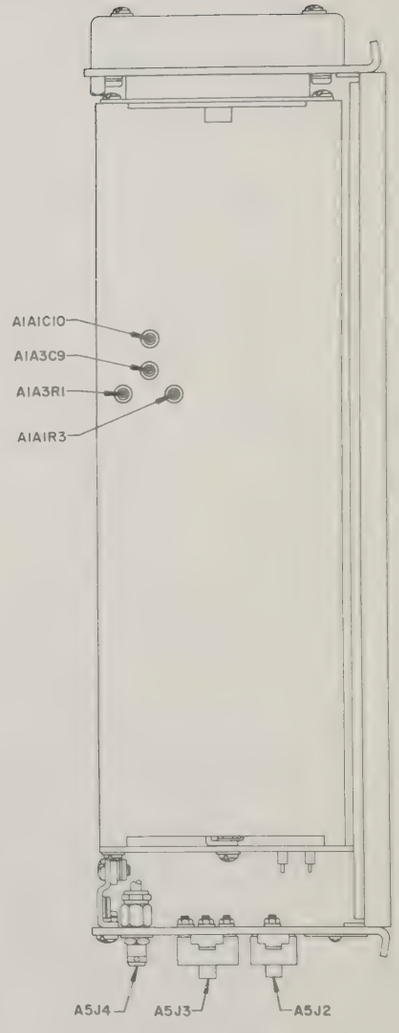
A2 DETAIL



LEFT SIDE VIEW



TOP VIEW



RIGHT SIDE VIEW

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Figure 5–4. RT-131A Receiver-Transmitter, Adjustment and Test Point Location Diagram

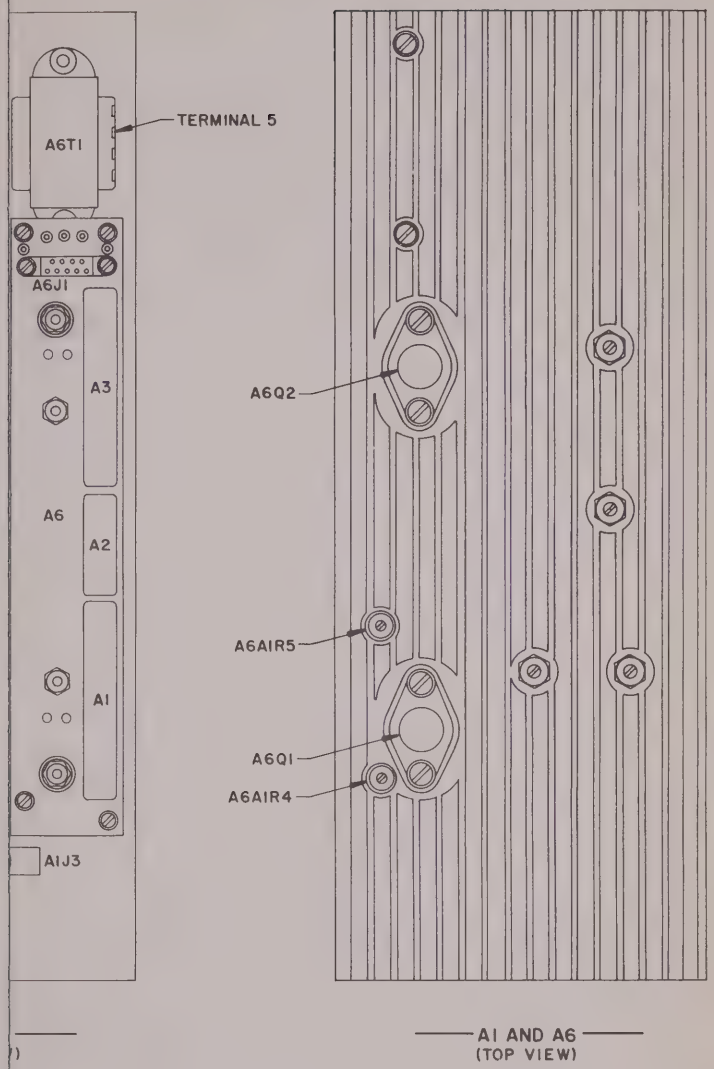
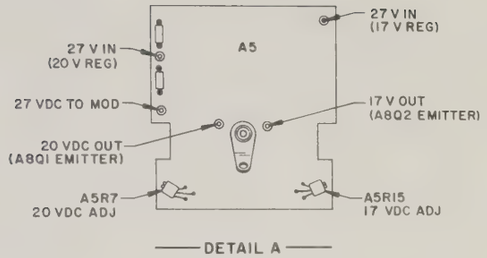
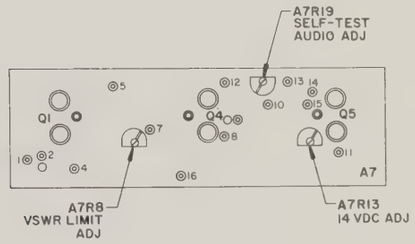


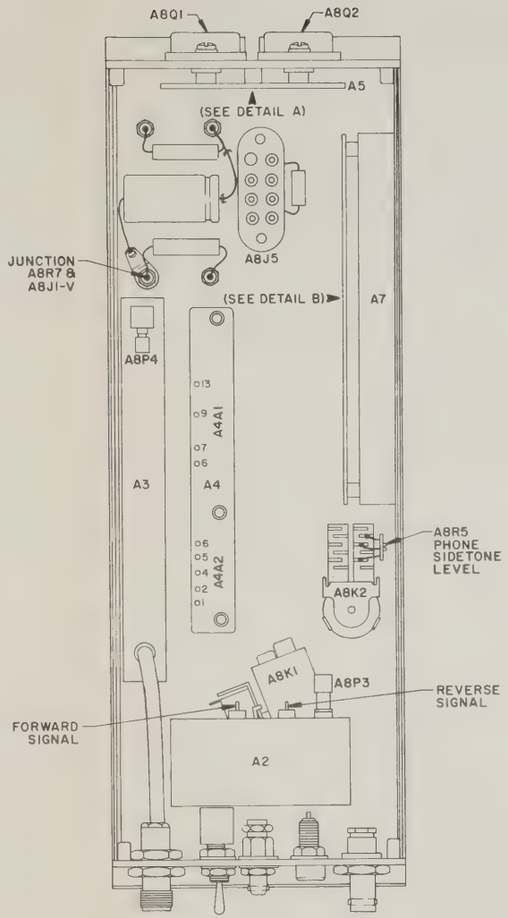
Figure 5–5. RTA-131B Accessory Unit, Adjustment and Test Point Location Diagram



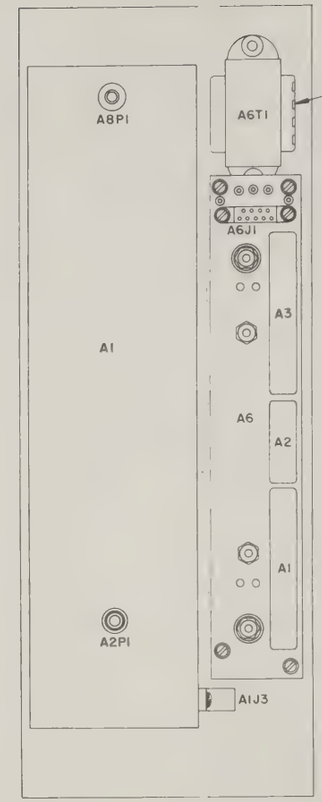
DETAIL A



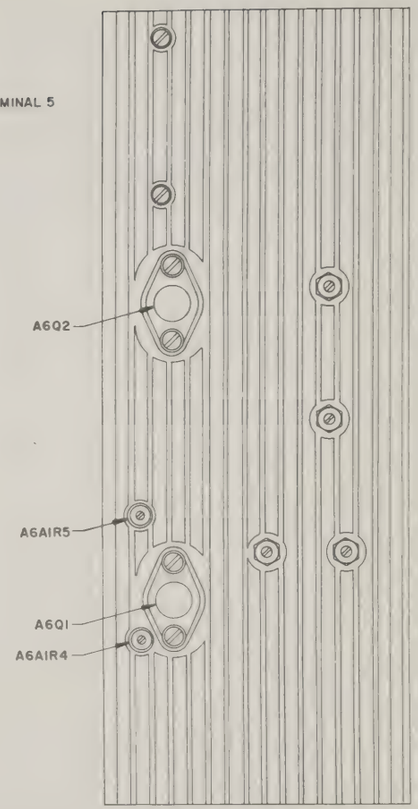
DETAIL B



TOP VIEW
(A1 AND A6 REMOVED)

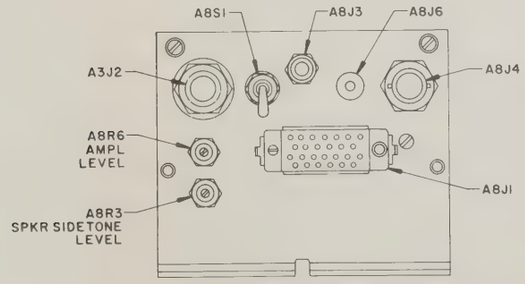


A1 AND A6
(BOTTOM VIEW)



A1 AND A6
(TOP VIEW)

4951



FRONT VIEW

Figure 5–5. RTA-131B Accessory Unit, Adjustment and Test Point Location Diagram

Step 2. Connect Hewlett-Packard Model 608D Signal Generator through Hewlett-Packard Model 00505B Attenuator to antenna connector A8J4 of the accessory unit.

Step 3. Set MHz and FRACT MHz controls to 126.500 MHz, and set 608D for output signal at 126.500 MHz with 30 percent modulation of 1000 Hz.

Step 4. Connect Ballantine Model 300D vtvm to detector output (A2A4, terminal 6).

Step 5. In sequence, adjust first i-f output adjust A2A1C9, filter match adjust A2A1C10, second mixer output adjust A2A2C8, and second i-f amplifier output adjust A2A3C13 for maximum detector output on 300D.

Step 6. Connect dc probe of Hewlett-Packard Model 410B vtvm to agc bus of Assembly A2 (A2A4, terminal 11).

Step 7. Set attenuator of 608D to 5 μV and turn i-f gain adjust A2A1R11 clockwise until agc voltage indicated on 410B just starts to rise.

Step 8. Vary 608D attenuator from 5 μV to 100,000 μV and check that maximum agc voltage rise indicated on 410B is not more than 3 dB with no roll back.

5–12. ADJUSTMENT OF AUDIO COMPRESSOR A2A5.

To adjust audio compressor A2A5 of the receiver-transmitter, proceed as follows:

Step 1. Interconnect 131B as shown in Figure 5–1 and apply power.

Step 2. Connect Hewlett-Packard Model 608D Signal Generator through Hewlett-Packard Model 00505B Attenuator to antenna connector A8J4 of the accessory unit. Adjust 608D for output signal of 5 μV at 126.000 MHz with 30 percent modulation of 1000 Hz.

Step 3. Set MHz and FRACT MHz controls to 126.000 MHz.

Step 4. Connect Ballantine Model 300D vtvm and Tektronix Model 545B Oscilloscope in parallel across a 250-ohm load (headset) to phone output at speaker-phone switch.

Step 5. Set volume control on control unit fully clockwise and adjust compressor output adjust A2A5R8 for a 5-volt indication on 300D.

Step 6. Increase 608D output signal to 20 μV and adjust volume control on control unit for 3-volt indication on 300D.

Step 7. Increase modulation of 608D signal to 85 percent and adjust compressor input adjust A2A5R1 for phone output on 300D to be 3 dB higher than the 3-volt indication in Step 6. Observe that output waveshape on 545B is not clipped.

Step 8. Reduce output level of 608D to 5 μV with 30 percent modulation and turn volume control on control unit fully clockwise. Phone output indicated on 300D should be 5 volts.

5–13. ADJUSTMENT OF SQUELCH ASSEMBLY A2A6.

To adjust squelch assembly A2A6 of the receiver-transmitter, proceed as follows:

Step 1. Interconnect 131B as shown in Figure 5–1 and apply power.

Step 2. Connect Hewlett-Packard Model 608D Signal Generator through Hewlett-Packard Model 00505B Attenuator to antenna connector A8J4 of accessory unit.

Step 3. Connect headset to phone output.

Step 4. Connect Ballantine Model 300D vtvm to detector output (A2A3, terminal 6).

Step 5. Set MHz and FRACT MHz controls to 126.000 MHz, and adjust 608D for an output signal 4 dB S+N/N (but not less than 1.5 μV) at 126.000 MHz.

Step 6. Turn squelch noise adjust A2A6R2 fully counterclockwise, and turn carrier adjust A2A6R12 fully clockwise.

Note

In some units, A2A6R12 is replaced with a fixed resistor.

Step 7. Turn squelch carrier adjust A2A4R8 clockwise until squelch breakthrough is heard on headset.

Step 8. Remove modulation from 608D signal and increase 608D output until detector output indicated on 300D stops rising.

Step 9. Turn A2A6R2 clockwise until signal is squelched, then turn it counterclockwise until signal just breaks through.

5–14. SPEAKER AMPLIFIER, MODULATOR, AND SIDETONE ADJUSTMENTS.

To adjust the speaker amplifier input, the modulation circuits, and the sidetone circuits in the accessory unit, proceed as follows:

Step 1. Interconnect 131B and test equipment as shown in Figure 5–3. Connect linear detector to A8J4. (Make sure Bird Electronic Model 43 Thruline Wattmeter and 50-ohm load are also connected to linear detector.)

Step 2. Apply power and select 127.000 MHz on MHz and FRACT MHz controls.

Step 3. Turn amplifier level control A8R6 fully clockwise.

Step 4. Connect Hewlett-Packard Model 200AB Audio Oscillator to speaker amplifier input (B, A8J1), and adjust 200AB for output signal of 250 mV at 1000 Hz.

Step 5. Set speaker-phone switch to speaker and connect General Radio Type 1840-A Audio Power Meter across 4-ohm speaker; 1840-A should indicate a minimum of 10 watts.

Step 6. Readjust 200AB for output of 550 mV and adjust A8R6 for 10 watts speaker output on the 1840-A.

Step 7. Reduce output of 200AB to zero and reconnect it through dummy microphone (see Figure 5–3) to mike audio input (A, A8J1).

Step 8. Key transmitter. Power output indicated on Bird Electronic Model 43 R-f Wattmeter should be at least 16 watts. Release key.

Step 9. Adjust 200AB for microphone input signal of 1 volt at 1000 Hz through dummy microphone.

Step 10. Key transmitter and check that modulation percentage indicated on Tektronix Model 545B Oscilloscope is at least 85 percent. If necessary, adjust modulation output level A6A1R5 for 85 percent upward modulation. Release key.

Step 11. Readjust 200AB for microphone input signal of 2.5 volts at 1000 Hz, and key transmitter. Modulation percentage indicated on 545B should not exceed 100 percent downward modulation.

Step 12. If necessary, readjust A6A1R5 so that downward modulation does not exceed 100 percent. Release key.

Step 13. On control unit, select frequencies between 118 and 136 MHz. Key transmitter at each frequency selected and check that modulation across the band is greater than 85 percent upward modulation but does not exceed 100 percent downward modulation.

Step 14. With 1840-A still connected across 4-ohm speaker, set speaker-phone switch to speaker and key transmitter. Adjust speaker sidetone level A8R3 for a 200 mW indication on 1840-A.

Step 15. Set speaker-phone switch to phone and connect a headset to phone output.

Step 16. Reconnect 1840-A across headset.

Step 17. Key transmitter and adjust phone sidetone level A8R5 for a 100 mW indication on 1840-A. Release key.

5–15. VSWR LIMIT ADJUSTMENT.

To adjust VSWR limit control A7R8, proceed as follows:

Step 1. Connect 131B and test equipment as shown in Figure 5–3. Connect linear detector to A8J4.

Step 2. Apply power and adjust VSWR limit control A7R8 to maximum counterclockwise position.

Step 3. Connect dc probe of Hewlett-Packard Model 410B vtvm to red terminal A8J6 on front panel of accessory unit.

Step 4. Disconnect lead from antenna connector A8J4, and, using A8S1 on the front panel of the accessory unit, key transmitter.

Step 5. Rotate MHz control from 118 to 136 MHz, observing indication on 410B at each frequency. Note and record lowest voltage indication and the frequency at which it occurs.

CAUTION

Be careful not to key transmitter for longer than 10-second intervals while the antenna load is disconnected.

Step 6. Set MHz control to frequency noted in Step 5.

Step 7. Disconnect the 410B, and connect a low-impedance dc power source to red terminal A8J6. Adjust power source for a dc voltage which is 0.1 volt lower than that noted in Step 5.

Step 8. Using regular transmitter keying switch, key transmitter and adjust A7R8 clockwise until transmitter just shuts down (indicated by drop in dc current level on primary power supply).

Step 9. Release key and remove power source from A8J6.

Step 10. Reconnect antenna load to A8J4, and key transmitter on and off several times. Check that transmitter turns on and off normally with transmitter key.

5–16. ALIGNMENT OF TRANSMITTER AMPLIFIER A1.

Transmitter amplifier assembly A1 of the accessory unit will require realignment only when major repairs have been made in the circuit. When any transistor has been replaced, only the discrete transistor circuit should require readjustment. To align A1, proceed as follows:

Step 1. Interconnect 131B and test equipment as shown in Figure 5–6.

Step 2. Adjust A1C16, A1C17, A1C18, A1C19, A1C20, and A1C21 for maximum capacity (clockwise), then back off one-half turn.

Step 3. Adjust A1T1, A1T2, and A1T3 so that the top of the core is even with the top of the coil form.

Step 4. Select 127.000 MHz on control unit and apply power.

Step 5. Connect Boonton Electronics Model 91C R-f Voltmeter to junction of A1J1 and A1R1.

Step 6. Key transmitter and check that input signal to A1 is at least 0.6 volt ac, as indicated on 91C. Disconnect 91C.

Step 7. Observing indication on Bird Electronic Model 43 Thruline Wattmeter, key transmitter and adjust A1C16, A1C17, A1C18, A1C19, A1C20, and A1C21 for maximum power output.

Step 8. Disconnect transmitter drive input at A8J3 and connect Kay Electronic Model 159B Sweep Frequency Generator to A8J3. Set 159B to cover range of 116 to 136 MHz. Connect jumper between terminals 4 and 5 of modulation transformer A6T1.

Step 9. Key transmitter and readjust A1C16-A1C21 for a flat response from 118 to 136 MHz.

Step 10. Disconnect jumper from A6T1. Unsolder 15-volt output lead from terminal 11 of A7 (Figure 5–5) and connect 0-5 ampere ammeter between terminal 11 of A7 and 15-volt lead.

Step 11. Key transmitter and check power output on all frequencies between 118 and 136 MHz. Power output on wattmeter should not vary more than 4 watts across the band, and input current on ammeter should not exceed 4 amperes.

Step 12. Remove 0-5-ampere ammeter and resolder 15-volt lead to terminal 11 of A7.

Step 13. Disconnect 159B and reconnect transmitter drive in to A8J3. Disconnect 159B detector lead from Empire Devices Model AT-70 (20 dB) Attenuator, and connect AT-70 output through Applied Research Type HFA-50 Attenuator (50 dB) to Nelson Ross Type NR Spectrum Analyzer.

Step 14. Key transmitter and check for spurious outputs on all frequencies between 118 and 136 MHz. Any spurious output should be at least 60 dB down from the maximum carrier. The only impulse discernible should be a single marker denoting the carrier.

5–17. RECEIVER AND TRANSMITTER SELF-TEST ADJUSTMENTS.

Receiver. Receiver self-test level control A1A1R3 may require adjustment if the R/T OK lamp on the control unit fails to light and glow steadily when a receiver self-test signal (R) is selected and the receiver is found to have normal sensitivity. To adjust A1A1R13, proceed as follows:

Step 1. Interconnect 131B as shown in Figure 5–1 and apply power.

Step 2. Connect Hewlett-Packard Model 608D to antenna input A8J4 of the accessory unit. Adjust 608D for an unmodulated 20-μV signal at 135.950 MHz.

Step 3. Set MHz and FRACT MHz controls to 135.950 MHz.

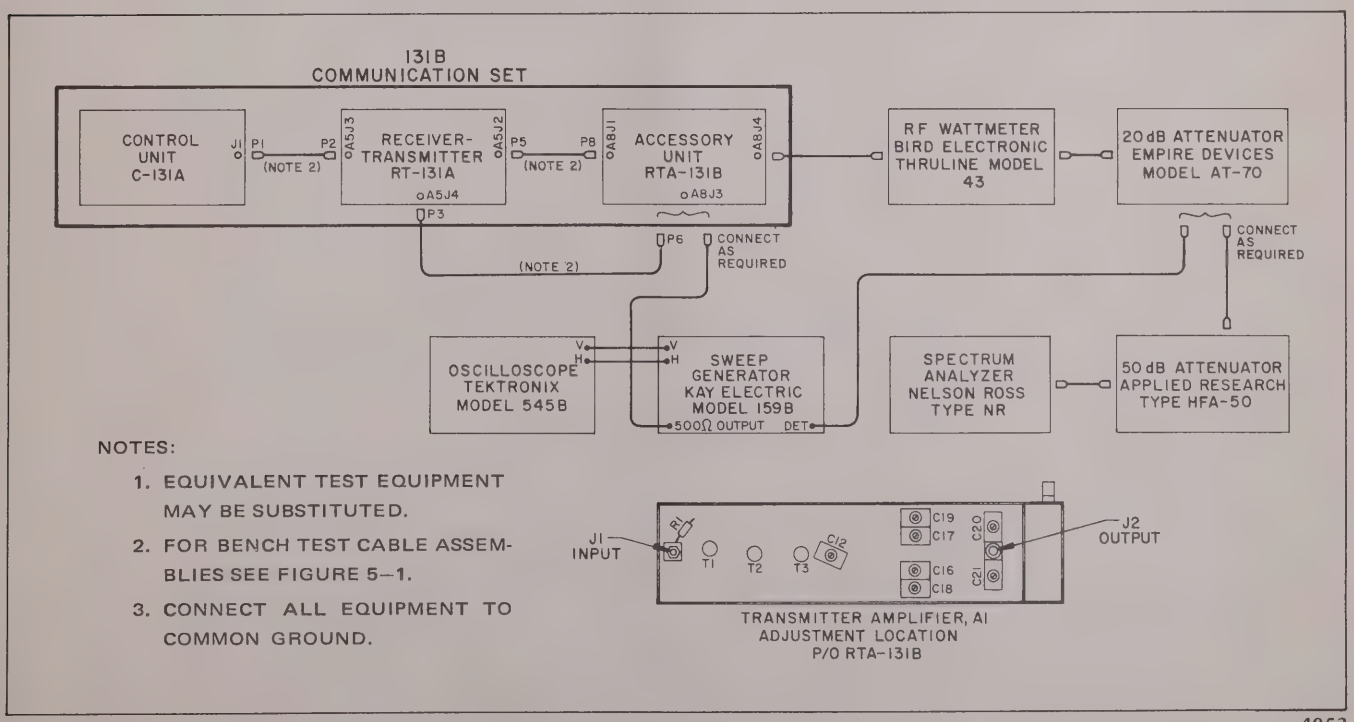


Figure 5–6. Bench Test Interconnection Diagram For Alignment of Transmitter Amplifier A1

Step 4. Connect dc probe of Hewlett-Packard Model 410B vtvm to agc bus (terminal 11 of A2A4 in the receiver-transmitter). Note agc voltage indicated on 410B.

Step 5. Disconnect 608D from A8J4 and select receiver self-test signal (R) on R/T TEST switch on the control unit.

Step 6. Adjust A1A1R13 as necessary to obtain same agc voltage indication on 410B as was noted in Step 4. R/T OK lamp should light and glow steadily.

Transmitter. The self-test audio signal input to signal sensor A4A1 for transmitter self-test is determined by the setting of transmitter self-test audio adjust A3R23 in regulator assembly A3 of the receiver-transmitter and by the setting of self-test audio adjust A7R19 in the accessory unit. To adjust the self-test audio signal, proceed as follows:

Step 1. Interconnect the 131B as shown in Figure 5–1. At the terminal board in the cable assembly, disconnect receiver-transmitter test audio out (A5J2, C) from accessory unit test audio in (A8J1, C). Connect a 7500-ohm resistor from receiver-transmitter test audio out to ground.

Step 2. Apply power and set MHz and FRACT MHz controls to 127.000 MHz.

Step 3. Connect Ballantine Model 300D vtvm across 7500-ohm resistor.

Step 4. Select receiver self-test signal on control unit (R/T TEST switch held at R), and adjust A3R23 for 2-volt indication on 300D.

Step 5. Disconnect 300D and 7500-ohm resistor. On terminal board, reconnect receiver-transmitter test audio out to accessory unit test audio in.

Step 6. Set self-test audio adjust A7R19 to maximum clockwise position.

Step 7. Disconnect transmitter drive in at A8J3 of the accessory unit and connect Hewlett-Packard Model 608D to A8J3. Adjust 608D for input signal at 127.000 MHz.

Step 8. See Figure 5–3, and connect Bird Electronic Model 43 Thruline Wattmeter through linear detector to antenna connector A8J4.

Step 9. Select transmitter self-test signal (T) on R/T TEST switch on the control unit, and adjust 608D attenuator to obtain a 1-watt r-f power indication on wattmeter.

Step 10. Connect dc probe of Hewlett-Packard Model 410B vtvm to terminal 13 of signal sensor A4A1 or terminal K of A8J1. Adjust A7R19 to obtain a 10-volt indication on 410B.

Step 11. Reduce attenuator setting of 608D so that indication on wattmeter is less than one watt. Indication on 410B should drop to 2.5 volts. Increase attenuator setting of 608D so that power output is greater than one watt and note that indication on 410B is 10 volts.

Step 12. Disconnect 608D and reconnect transmitter drive in to A8J3. Connect microphone to accessory unit.

Step 13. Depress transmitter keying switch and speak into microphone. With sufficient voice modulation, voltage indication on 410B should rise from 2.5 to 10 volts, and R/T OK lamp on control unit should glow simultaneously with rise in voltage indication.

SECTION 6
DIAGRAMS

Figure 6–1. RT-131A Receiver-Transmitter, Schematic Diagram

Figure 6–2. RT-131A Receiver-Transmitter, Main Wiring Diagram

Figure 6–3. RT-131A Receiver-Transmitter, R-f Assembly A1, Wiring Diagram

Figure 6–4. RTA-131B Accessory Unit, Schematic Diagram

Figure 6–5. RTA-131B Accessory Unit, Main Wiring Diagram

Figure 6–6. RTA-131B Accessory Unit, Printed Circuit Boards for Assemblies A1, A5, A6, and A7, Wiring Diagram

Figure 6–7. C-131A Control Unit, Schematic Diagram

Figure 6–8. C-131A Control Unit (Standard), Wiring Diagram

Figure 6–9. C-131A Control Unit (Custom), Wiring Diagram

NOTES:

1. REFERENCE DESIGNATIONS ARE ABBREVIATED. FOR COMPLETE IDENTIFICATION, PREFIX PART DESIGNATION WITH ASSEMBLY DESIGNATION AND SUBASSEMBLY DESIGNATION; FOR EXAMPLE: A1A1C1, A3C1.
2. FOR WIRING AND PARTS LOCATION DIAGRAMS, SEE FIGURES 6–2 AND 6–3.
3. CAPACITOR VALUES ARE IN MICROFARADS (μF) UNLESS OTHERWISE NOTED.
4. INDUCTOR VALUES ARE IN MICROHENRIES (μH) UNLESS OTHERWISE NOTED.
5. TRANSISTORS A1A3Q1 AND A1A3Q2 ARE MATCHED AND MUST BE REPLACED AS A PAIR.
6. TERMINAL DESIGNATIONS FOR A2A1–A2A7, A3, AND E1–E4 ARE ASSIGNED FOR REFERENCE ONLY; THEY ARE NOT STAMPED ON THE ASSEMBLIES.
7. IN SOME UNITS, A2A6R12 IS REPLACED WITH A FIXED RESISTOR. IN SOME UNITS A 680-OHM RESISTOR IS EXTERNALLY CONNECTED BETWEEN TERMINAL 14 OF A2A6 AND GROUND.
8. SELF-TEST AUDIO LEVEL RESISTOR A3R23 NOT USED IN SOME MODELS. IN THESE UNITS, SELF-TEST AUDIO IS CONNECTED DIRECTLY TO TERMINAL 21 OF A3P1.
9. IN SOME MODELS, R-F AMPLIFIER A1A2Q1 WAS TYPE 40469.
10. CONDITIONS FOR VOLTAGE MEASUREMENTS SHOWN IN RED ARE AS FOLLOWS:
    VOLTAGE MEASUREMENT ONLY—RECEIVE CONDITION, NO INPUT SIGNAL.
    VOLTAGE MEASUREMENT UNDERLINED—RECEIVE CONDITION, INPUT SIGNAL OF 100 μV AT 126.500 MHZ WITH 30% MODULATION OF 1000 HZ.
    VOLTAGE MEASUREMENT AND ASTERISK (*)—R/T TEST SWITCH IN R POSITION.
    ALL MEASUREMENTS ARE MADE WITH A HEWLETT-PACKARD MODEL 410B VTVM (OR EQUIVALENT) CONNECTED WITH RESPECT TO CHASSIS GROUND. UNITS OF THE SET ARE INTERCONNECTED AS SHOWN IN FIGURE 5–1. ALL VOLTAGES ARE POSITIVE DC UNLESS OTHERWISE NOTED.
11. GAIN MEASUREMENTS SHOWN IN RED WERE MADE UNDER THE FOLLOWING CONDITIONS:
    A. EQUIPMENT CONNECTED AS SHOWN IN FIGURE 5–1, LOW-VOLTAGE INPUT APPLIED.
    B. R-F SIGNAL OF 5 μV AT 126.500 MHZ, WITH 30% MODULATION OF 1000 HZ, APPLIED THROUGH A 9-DB ATTENUATOR TO RECEIVER R-F IN A5J5 TO OBTAIN 5 VAC REFERENCE OUTPUT MEASURED ACROSS A 250-OHM LOAD AT PHONE OUTPUT.

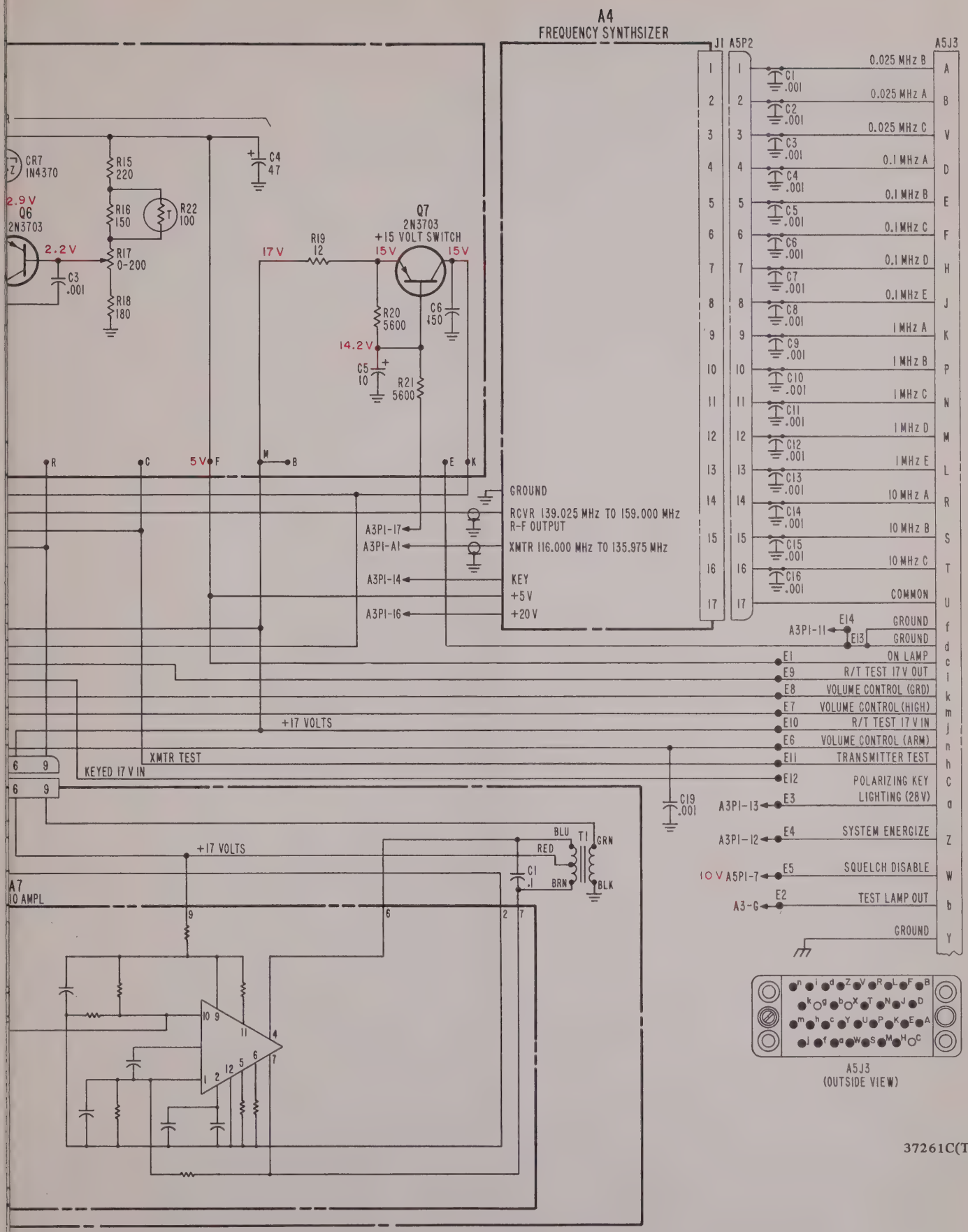


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Figure 6–1. RT-131A Receiver-Transmitter, Schematic Diagram

NOTES:

1. REFERENCE DESIGNATIONS ARE ABBREVIATED. FOR COMPLETE IDENTIFICATION, PREFIX PART DESIGNATION WITH ASSEMBLY DESIGNATION AND SUBASSEMBLY DESIGNATION; FOR EXAMPLE: A1A1C1, A3C1.
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4. INDUCTOR VALUES ARE IN MICROHENRIES (μH) UNLESS OTHERWISE NOTED.
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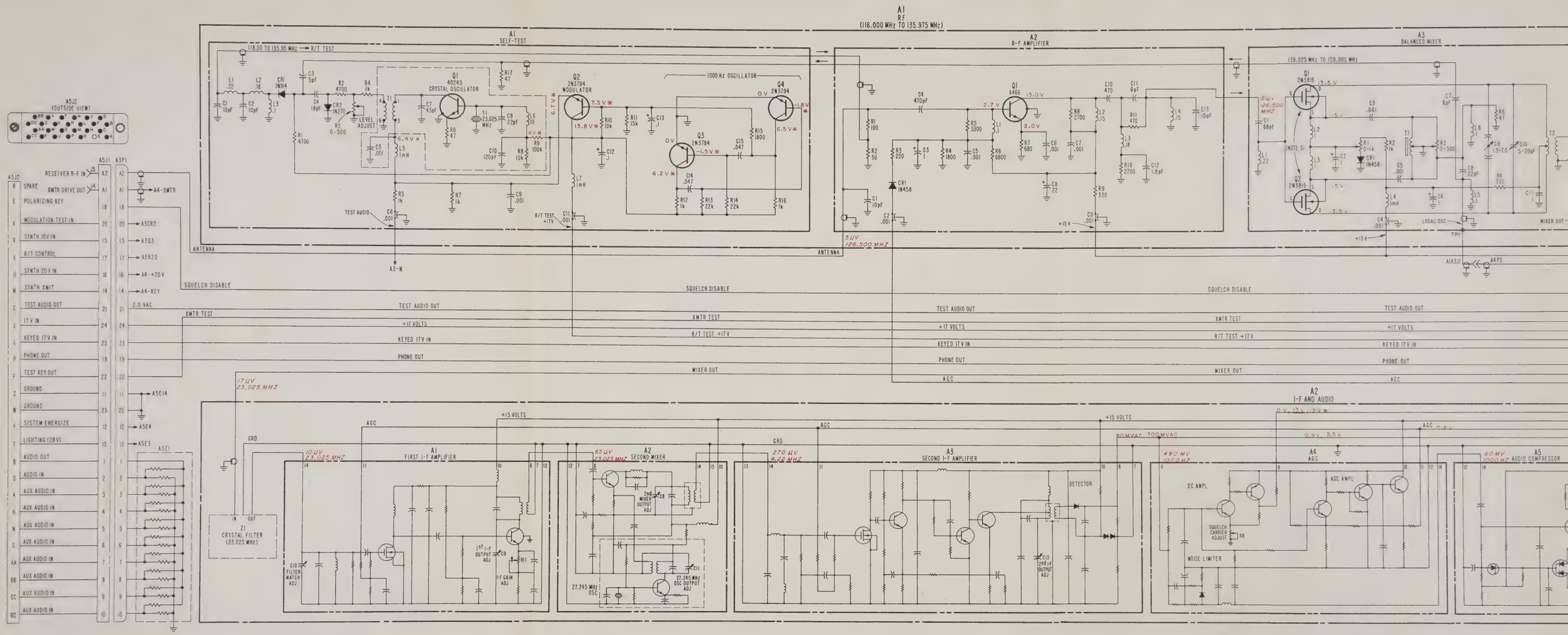
7. IN SOME UNITS, A2A6R12 IS REPLACED WITH A FIXED RESISTOR. IN SOME UNITS A 680-OHM RESISTOR IS EXTERNALLY CONNECTED BETWEEN TERMINAL 14 OF A2A6 AND GROUND.
8. SELF-TEST AUDIO LEVEL RESISTOR A3R23 NOT USED IN SOME MODELS. IN THESE UNITS, SELF-TEST AUDIO IS CONNECTED DIRECTLY TO TERMINAL 21 OF A3P1.
9. IN SOME MODELS, R-F AMPLIFIER A1A2Q1 WAS TYPE 40469.
10. CONDITIONS FOR VOLTAGE MEASUREMENTS SHOWN IN RED ARE AS FOLLOWS:

    VOLTAGE MEASUREMENT ONLY—RECEIVE CONDITION, NO INPUT SIGNAL.

    VOLTAGE MEASUREMENT UNDERLINED—RECEIVE CONDITION, INPUT SIGNAL OF 100 μV AT 126.500 MHZ WITH 30% MODULATION OF 1000 HZ.

    VOLTAGE MEASUREMENT AND ASTERISK (*)—R/T TEST SWITCH IN R POSITION.

    ALL MEASUREMENTS ARE MADE WITH A HEWLETT-PACKARD MODEL 410B VTVM (OR EQUIVALENT) CONNECTED WITH RESPECT TO CHASSIS GROUND. UNITS OF THE SET ARE INTERCONNECTED AS SHOWN IN FIGURE 5–1. ALL VOLTAGES ARE POSITIVE DC UNLESS OTHERWISE NOTED.
11. GAIN MEASUREMENTS SHOWN IN RED WERE MADE UNDER THE FOLLOWING CONDITIONS:
    A. EQUIPMENT CONNECTED AS SHOWN IN FIGURE 5–1, LOW-VOLTAGE INPUT APPLIED.
    B. R-F SIGNAL OF 5 μV AT 126.500 MHZ, WITH 30% MODULATION OF 1000 HZ, APPLIED THROUGH A 9-DB ATTENUATOR TO RECEIVER R-F IN A5J5 TO OBTAIN 5 VAC REFERENCE OUTPUT MEASURED ACROSS A 250-OHM LOAD AT PHONE OUTPUT.


A1
RF
(116.000 MHz TO 135.975 MHz)
A1
SELF-TEST
118.00 TO 135.95 MHz → R/T TEST
Q1
40245
CRYSTAL OSCILLATOR
Q2
2N3794
MODULATOR
Q3
2N3794
Q4
2N3794
1000 Hz OSCILLATOR
LEVEL ADJUST
A2
R-F AMPLIFIER
Q1
A466
CR1
IN458
A3
BALANCED MIXER
139.025 MHz TO 159.000 MHz
Q1
2N3819
Q2
2N3819
(NOTE 5)
LOCAL OSC
TP1
MIXER OUT
A1A3J1
A4P3
A5J2
(OUTSIDE VIEW)
A5J2
A5J1
A3P1
RECEIVER R-F IN
XMTR DRIVE OUT
SPARE
POLARIZING KEY
MODULATION TEST IN
SYNTH 10V IN
R/T CONTROL
SYNTH 20 V IN
SYNTH XMIT
TEST AUDIO OUT
17 V IN
KEYED 17 V IN
PHONE OUT
TEST KEY OUT
GROUND
GROUND
SYSTEM ENERGIZE
LIGHTING (28 V)
AUDIO OUT
AUDIO IN
AUX AUDIO IN
A4-XMTR
A3CR2
A3J3
A3R20
A4-+20V
A4-KEY
2.0 VAC
A5E14
A5E4
A5E3
A3Z1
ANTENNA
A3-N
SQUELCH DISABLE
XMTR TEST
TEST AUDIO OUT
+17 VOLTS
KEYED 17 V IN
PHONE OUT
MIXER OUT
AGC
5 µV
126.500 MHZ
17 µV
23.025 MHZ
A1
FIRST I-F AMPLIFIER
A2
SECOND MIXER
A3
SECOND I-F AMPLIFIER
A2
I-F AND AUDIO
A4
AGC
A5
AUDIO COMPRESSOR
Z1
CRYSTAL FILTER
(23.025 MHz)
27.245 MHz
OSC
DETECTOR
DC AMPL
AGC AMPL
NOISE LIMITER
SQUELCH
CARRIER
ADJUST
+15 VOLTS
GRD
AGC

NOTES:

1. REFERENCE DESIGNATIONS ARE ABBREVIATED. FOR COMPLETE IDENTIFICATION, PREFIX PART DESIGNATION WITH ASSEMBLY DESIGNATION AND SUBASSEMBLY DESIGNATION; FOR EXAMPLE: A1A1C1, A3C1.
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4. INDUCTOR VALUES ARE IN MICROHENRIES (μH) UNLESS OTHERWISE NOTED.
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8. SELF-TEST AUDIO LEVEL RESISTOR A3R23 NOT USED IN SOME MODELS. IN THESE UNITS, SELF-TEST AUDIO IS CONNECTED DIRECTLY TO TERMINAL 21 OF A3P1.
9. IN SOME MODELS, R-F AMPLIFIER A1A2Q1 WAS TYPE 40469.
10. CONDITIONS FOR VOLTAGE MEASUREMENTS SHOWN IN RED ARE AS FOLLOWS:
    VOLTAGE MEASUREMENT ONLY—RECEIVE CONDITION, NO INPUT SIGNAL.
    VOLTAGE MEASUREMENT UNDERLINED—RECEIVE CONDITION, INPUT SIGNAL OF 100 μV AT 126.500 MHZ WITH 30% MODULATION OF 1000 HZ.
    VOLTAGE MEASUREMENT AND ASTERISK (*)—R/T TEST SWITCH IN R POSITION.
    ALL MEASUREMENTS ARE MADE WITH A HEWLETT-PACKARD MODEL 410B VTVM (OR EQUIVALENT) CONNECTED WITH RESPECT TO CHASSIS GROUND. UNITS OF THE SET ARE INTERCONNECTED AS SHOWN IN FIGURE 5–1. ALL VOLTAGES ARE POSITIVE DC UNLESS OTHERWISE NOTED.
11. GAIN MEASUREMENTS SHOWN IN RED WERE MADE UNDER THE FOLLOWING CONDITIONS:
    A. EQUIPMENT CONNECTED AS SHOWN IN FIGURE 5–1, LOW-VOLTAGE INPUT APPLIED.
    B. R-F SIGNAL OF 5 μV AT 126.500 MHZ, WITH 30% MODULATION OF 1000 HZ, APPLIED THROUGH A 9-DB ATTENUATOR TO RECEIVER R-F IN A5J5 TO OBTAIN 5 VAC REFERENCE OUTPUT MEASURED ACROSS A 250-OHM LOAD AT PHONE OUTPUT.

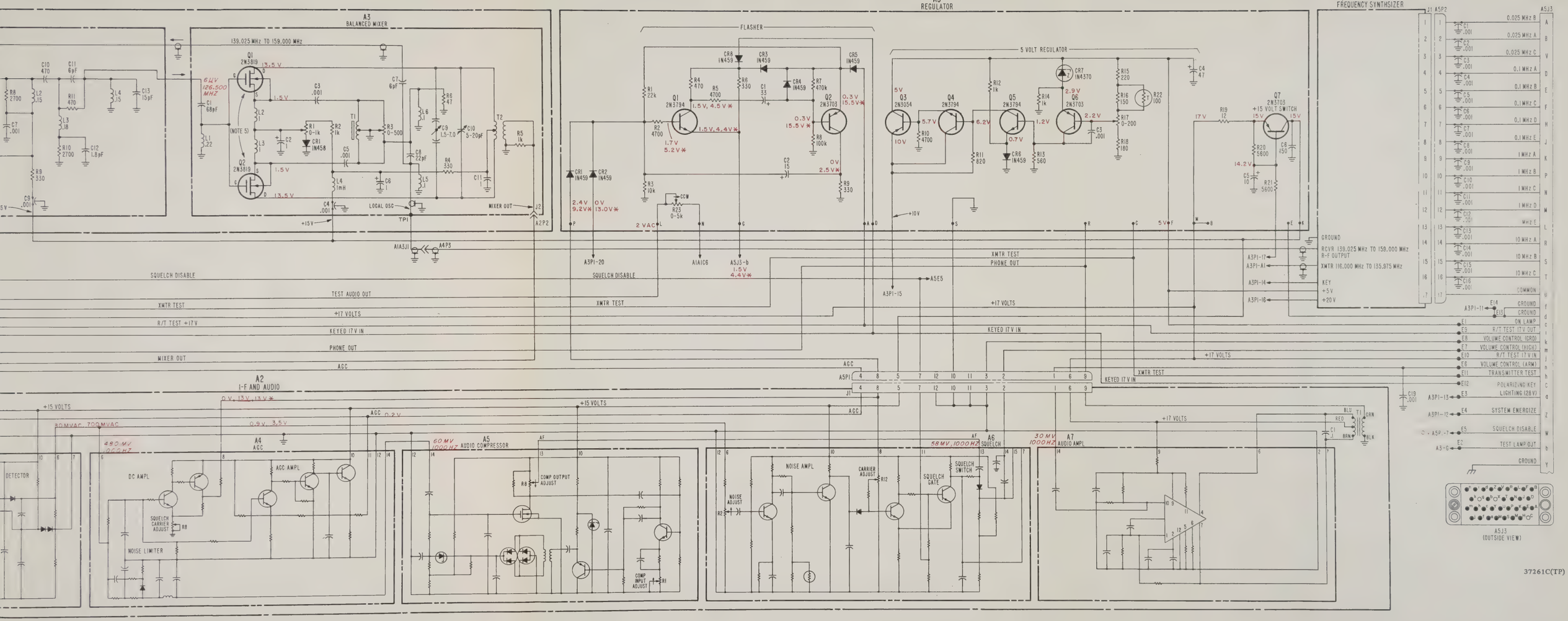


Figure 6–1. RT-131A Receiver-Transmitter, Schematic Diagram

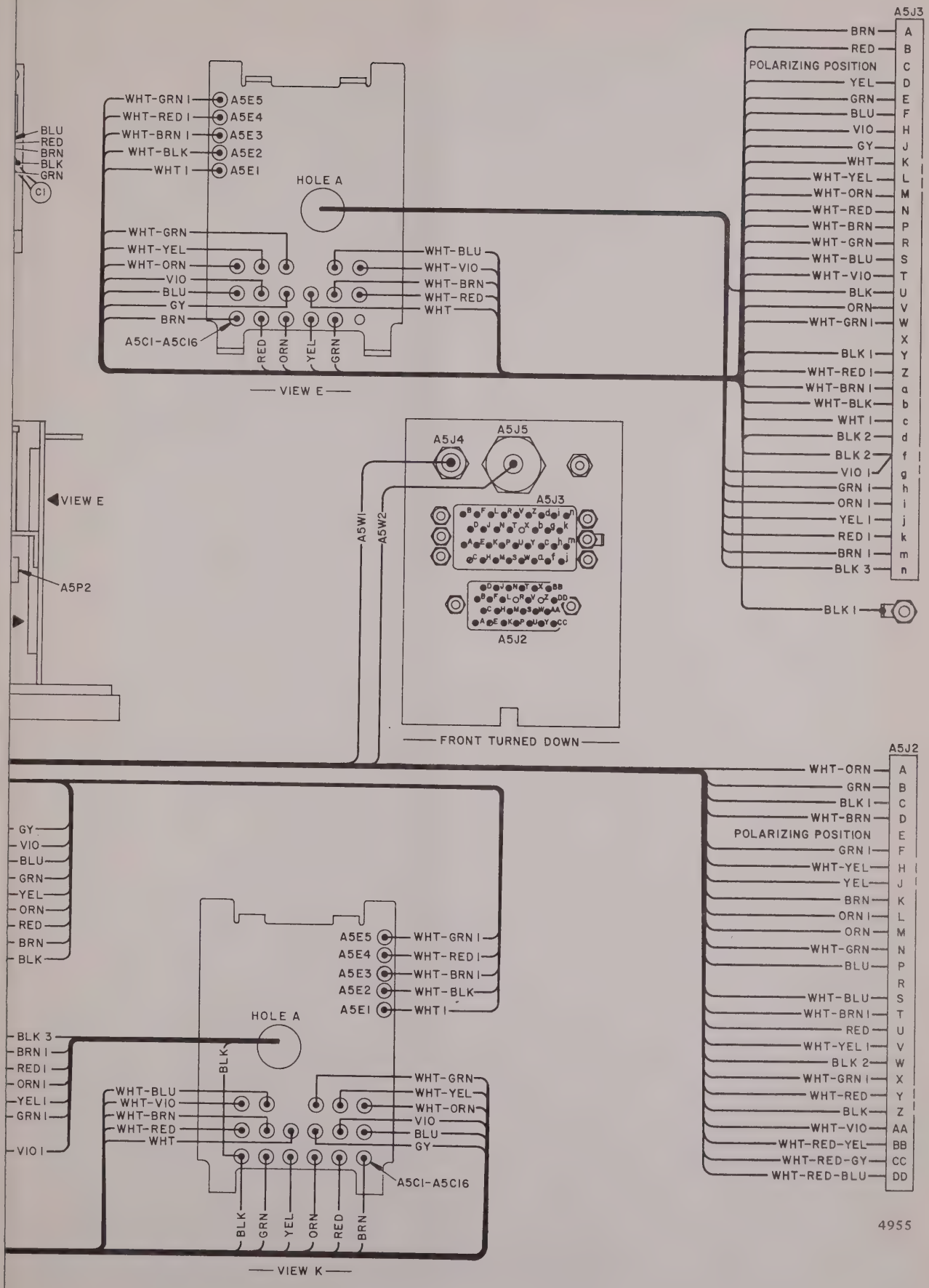
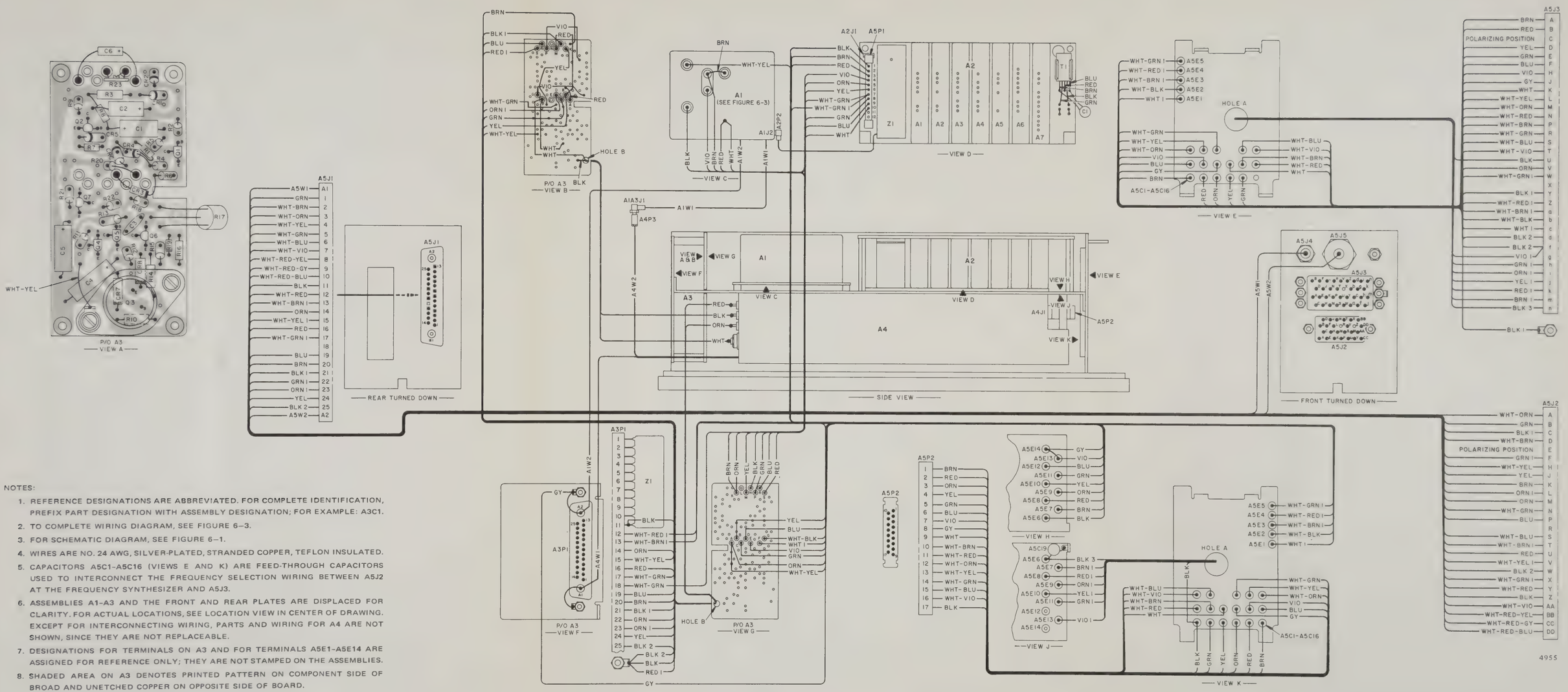


Figure 6–2. RT-131A Receiver-Transmitter, Main Wiring Diagram



NOTES:

1. REFERENCE DESIGNATIONS ARE ABBREVIATED. FOR COMPLETE IDENTIFICATION, PREFIX PART DESIGNATION WITH ASSEMBLY DESIGNATION; FOR EXAMPLE: A3C1.
2. TO COMPLETE WIRING DIAGRAM, SEE FIGURE 6–3.
3. FOR SCHEMATIC DIAGRAM, SEE FIGURE 6–1.
4. WIRES ARE NO. 24 AWG, SILVER-PLATED, STRANDED COPPER, TEFLON INSULATED.
5. CAPACITORS A5C1–A5C16 (VIEWS E AND K) ARE FEED-THROUGH CAPACITORS USED TO INTERCONNECT THE FREQUENCY SELECTION WIRING BETWEEN A5J2 AT THE FREQUENCY SYNTHESIZER AND A5J3.
6. ASSEMBLIES A1–A3 AND THE FRONT AND REAR PLATES ARE DISPLACED FOR CLARITY. FOR ACTUAL LOCATIONS, SEE LOCATION VIEW IN CENTER OF DRAWING. EXCEPT FOR INTERCONNECTING WIRING, PARTS AND WIRING FOR A4 ARE NOT SHOWN, SINCE THEY ARE NOT REPLACEABLE.
7. DESIGNATIONS FOR TERMINALS ON A3 AND FOR TERMINALS A5E1–A5E14 ARE ASSIGNED FOR REFERENCE ONLY; THEY ARE NOT STAMPED ON THE ASSEMBLIES.
8. SHADED AREA ON A3 DENOTES PRINTED PATTERN ON COMPONENT SIDE OF BROAD AND UNETCHED COPPER ON OPPOSITE SIDE OF BOARD.

Figure 6–2. RT-131A Receiver-Transmitter, Main Wiring Diagram

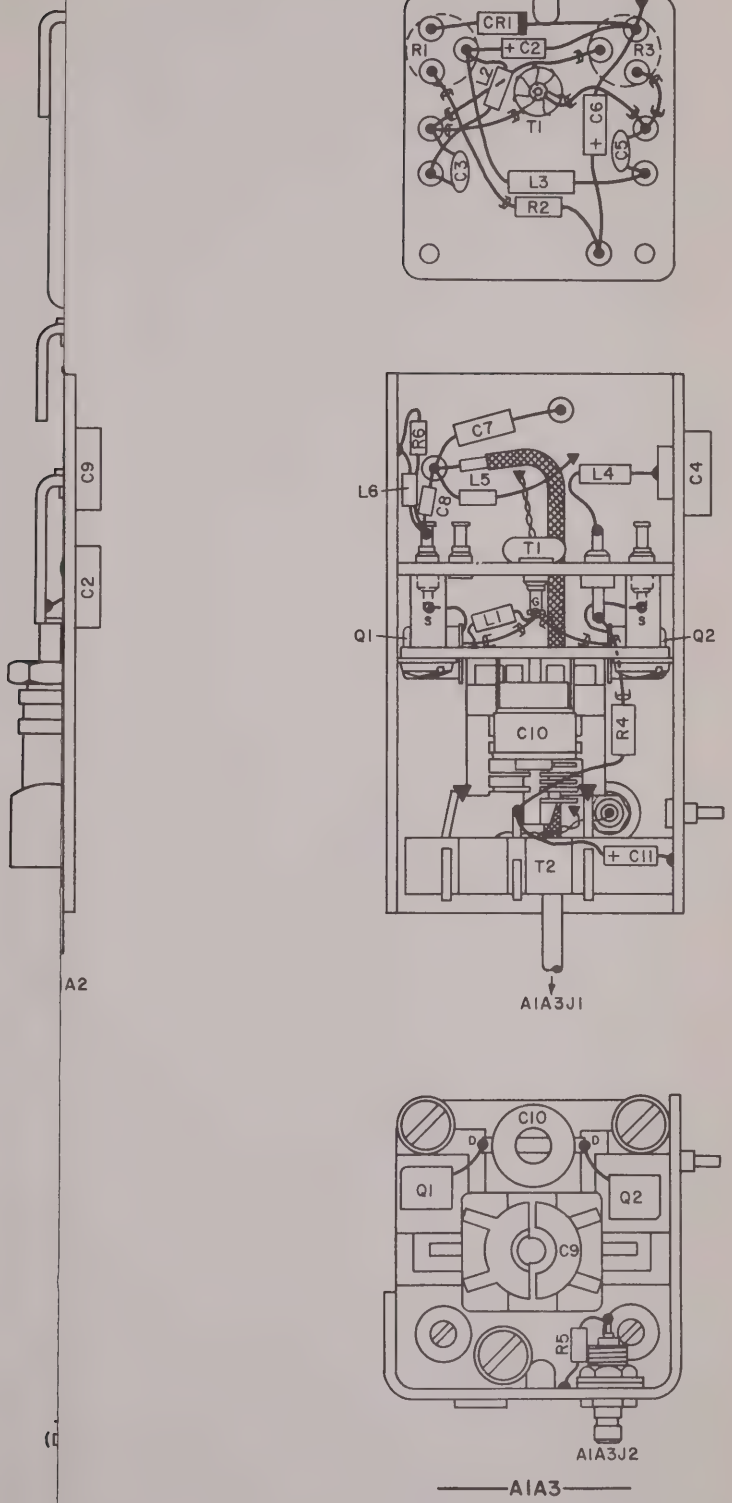


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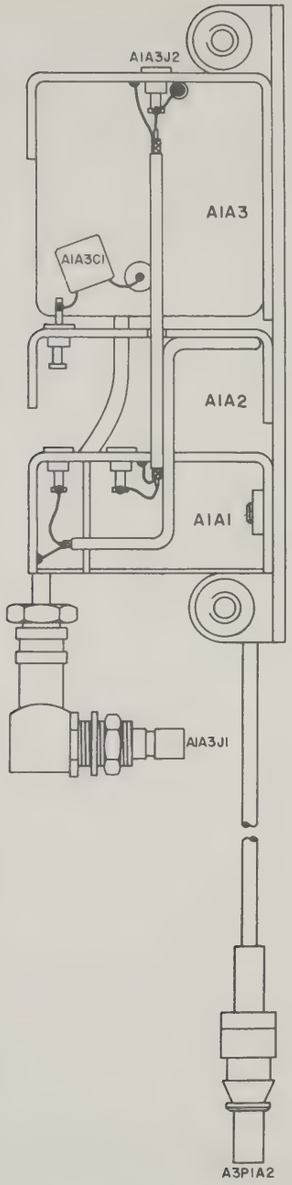
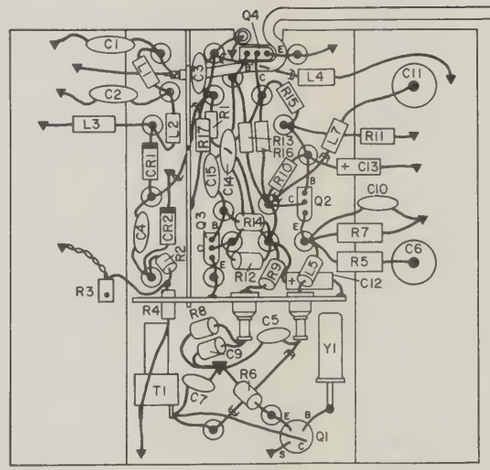
Figure 6–3. RT-131A Receiver-Transmitter, R-f Assembly A1, Wiring Diagram

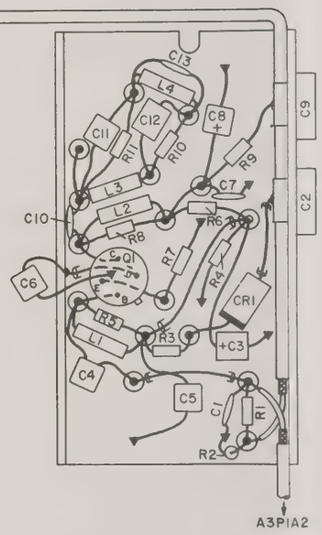
(ALL VIEWS ARE RIGHT SIDE UP, VIEWED FROM REAR)



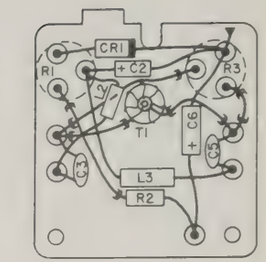
A1
(DETAIL PARTS OMITTED)

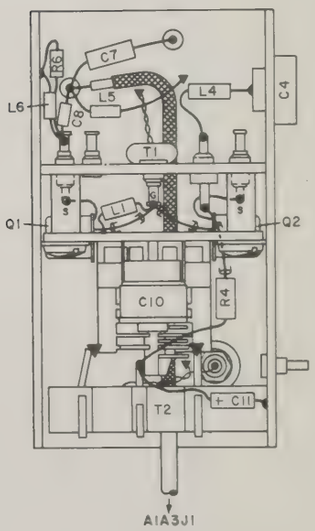


A1A1

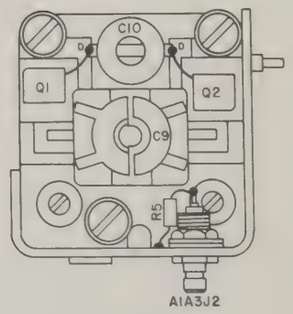


A1A2





A1A3J1



A1A3J2

A1A3

NOTES:

1. REFERENCE DESIGNATIONS ARE ABBREVIATED. FOR COMPLETE IDENTIFICATION, PREFIX PART DESIGNATION WITH ASSEMBLY DESIGNATION AND SUBASSEMBLY DESIGNATION; FOR EXAMPLE: A1A1C1.
2. FOR MAIN WIRING DIAGRAM, SEE FIGURE 6–2.
3. FOR SCHEMATIC DIAGRAM, SEE FIGURE 6–1.
4. ASSEMBLY IS SHOWN WITH SHIELD COVER REMOVED; END VIEWS OF A1A1 AND A1A3 ARE DISPLACED FOR CLARITY.
5. SELF-TEST ASSEMBLY A1A1 SHOWN WITH SHIELD REMOVED FROM CRYSTAL OSCILLATOR CIRCUIT.

4957

Figure 6–3. RT-131A Receiver-Transmitter, R-f Assembly A1, Wiring Diagram

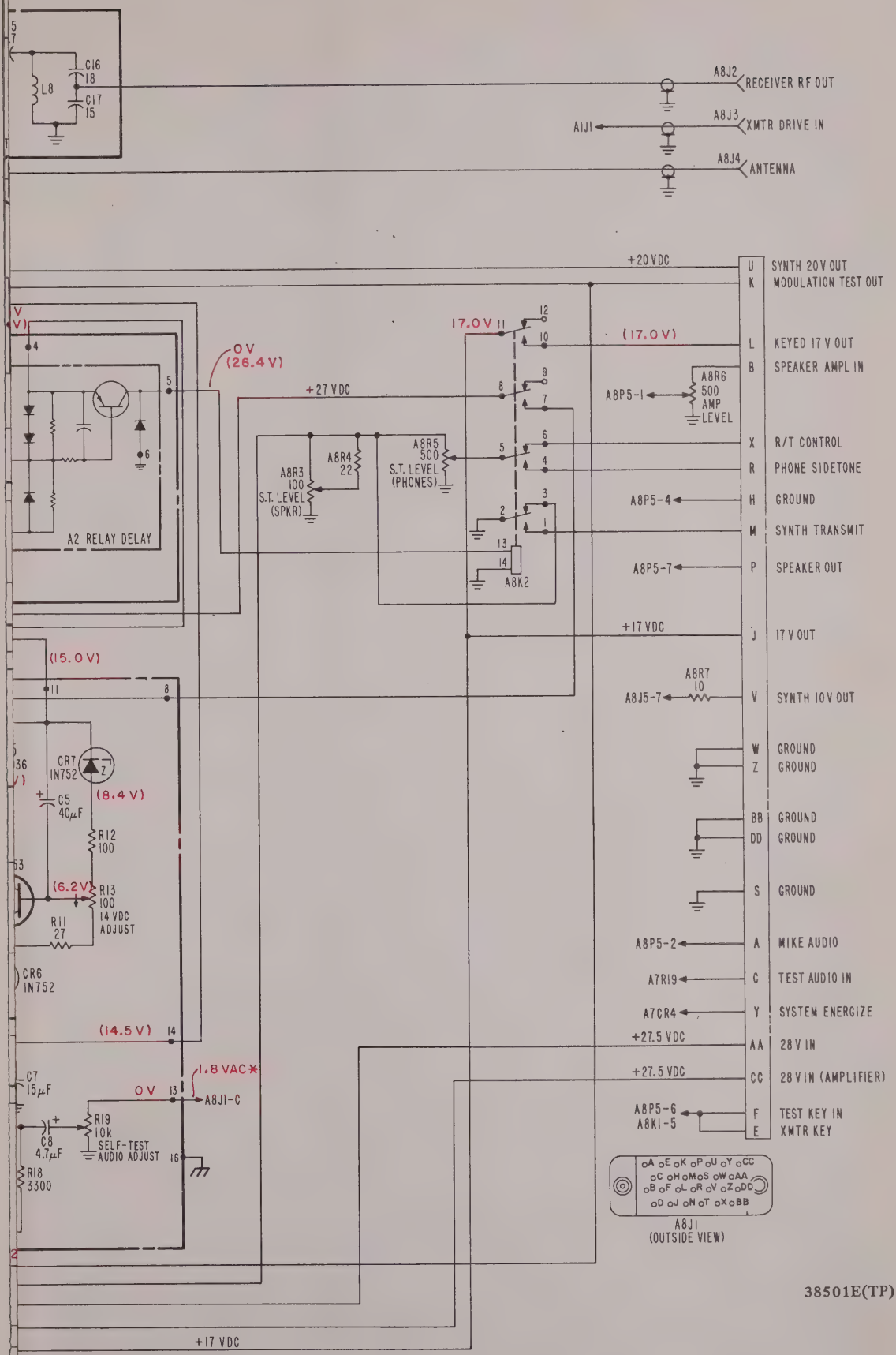


Figure 6–4. RTA-131B Accessory Unit, Schematic Diagram

NOTES:

1. REFERENCE DESIGNATIONS ARE ABBREVIATED. FOR COMPLETE IDENTIFICATION, PREFIX PART DESIGNATION WITH ASSEMBLY DESIGNATION; FOR EXAMPLE: A1C1.
2. FOR WIRING DIAGRAMS, SEE FIGURES 6-5 AND 6-6.
3. CAPACITOR VALUES ARE IN PICOFARADS (pF) UNLESS OTHERWISE NOTED.
4. INDUCTOR VALUES ARE IN MILLIHENRIES (mH) UNLESS OTHERWISE NOTED.
5. RELAYS ABK1 AND ABK2 ARE SHOWN UNENERGIZED.
6. ASSEMBLIES A2, A3, A4A1, A4A2, A5A1, A5A2, AND A5A3 ARE NON-REPAIRABLE ASSEMBLIES.
7. VOLTAGE MEASUREMENTS SHOWN IN RED ARE TYPICAL AND ARE MEASURED WITH 131B CONNECTED AS SHOWN IN FIGURE 5-1, WITH A 50-OHM LOAD CONNECTED TO ANTENNA CONNECTOR ABJ4, WITH NO SIGNAL INPUT. MEASUREMENTS ARE MADE WITH A HEWLETT-PACKARD MODEL 410B VTVM (OR EQUIVALENT) CONNECTED WITH RESPECT TO CHASSIS GROUND. VOLTAGES ARE POSITIVE DC UNLESS OTHERWISE NOTED. VOLTAGES SHOWN IN PARENTHESES ARE MEASURED WITH THE TRANSMITTER KEYED; THOSE MARKED WITH AN ASTERISK (*) ARE MEASURED WITH THE SELF-TEST SWITCH (R/T TEST) HELD IN THE T POSITION.
8. FOR MEASURING VOLTAGES IN TRANSMITTER AMPLIFIER A1, DISCONNECT ABP1 FROM A1J1 (TRANSMITTER DRIVE INPUT) TO PREVENT HIGH R-F FIELDS FROM AFFECTING VOLTAGE INDICATIONS.

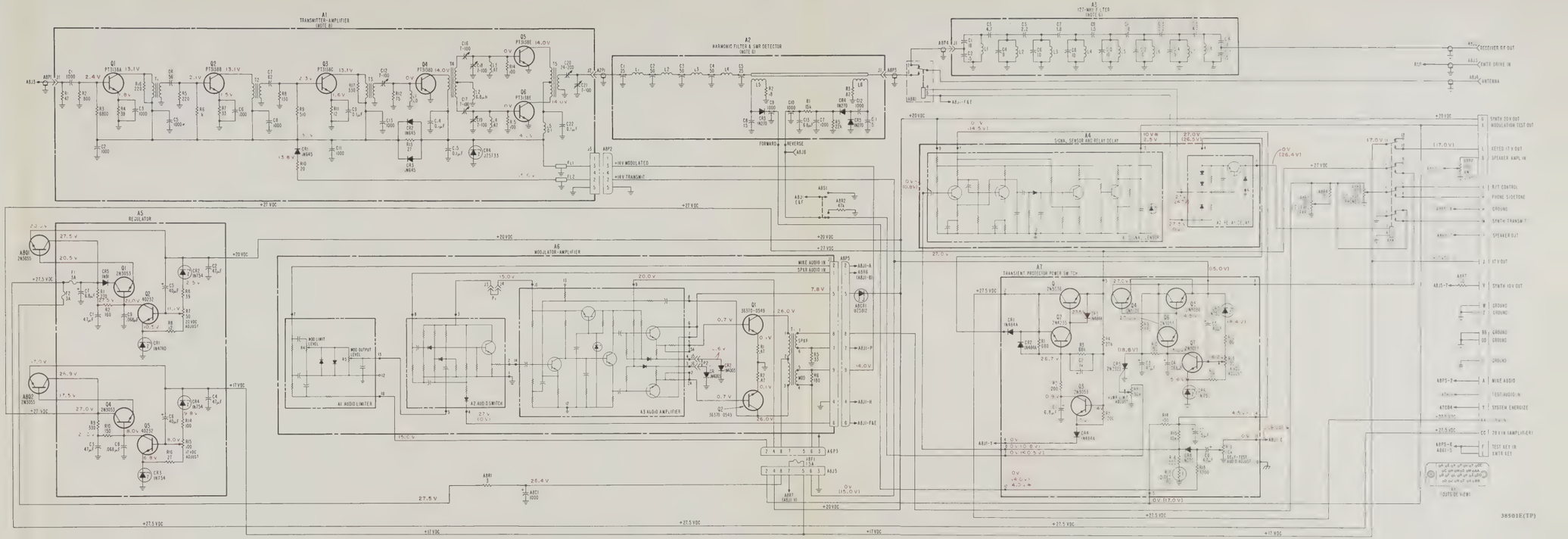


Figure 6-4. RTA-131B Accessory Unit, Schematic Diagram

NOTES:

1. REFERENCE DESIGNATIONS
   PLETE IDENTIFICATION, PR
   ASSEMBLY DESIGNATION;
2. TO COMPLETE WIRING DIA
3. FOR SCHEMATIC DIAGRAM
4. WIRES MARKED WITH CO
   STRANDED COPPER, TEFLO
   WITH COLOR NOTE AND AN
   STRANDED COPPER, TEFLO
   WITH COLOR NOTE AND DO
   AWG, STRANDED COPPER,
5. FRONT AND BACK ENDS O
   ARE TURNED DOWN AND A
   DISPLACED FOR CLARITY.
6. ASSEMBLIES A2, A3, AND
   REPAIRABLE AND MUST B

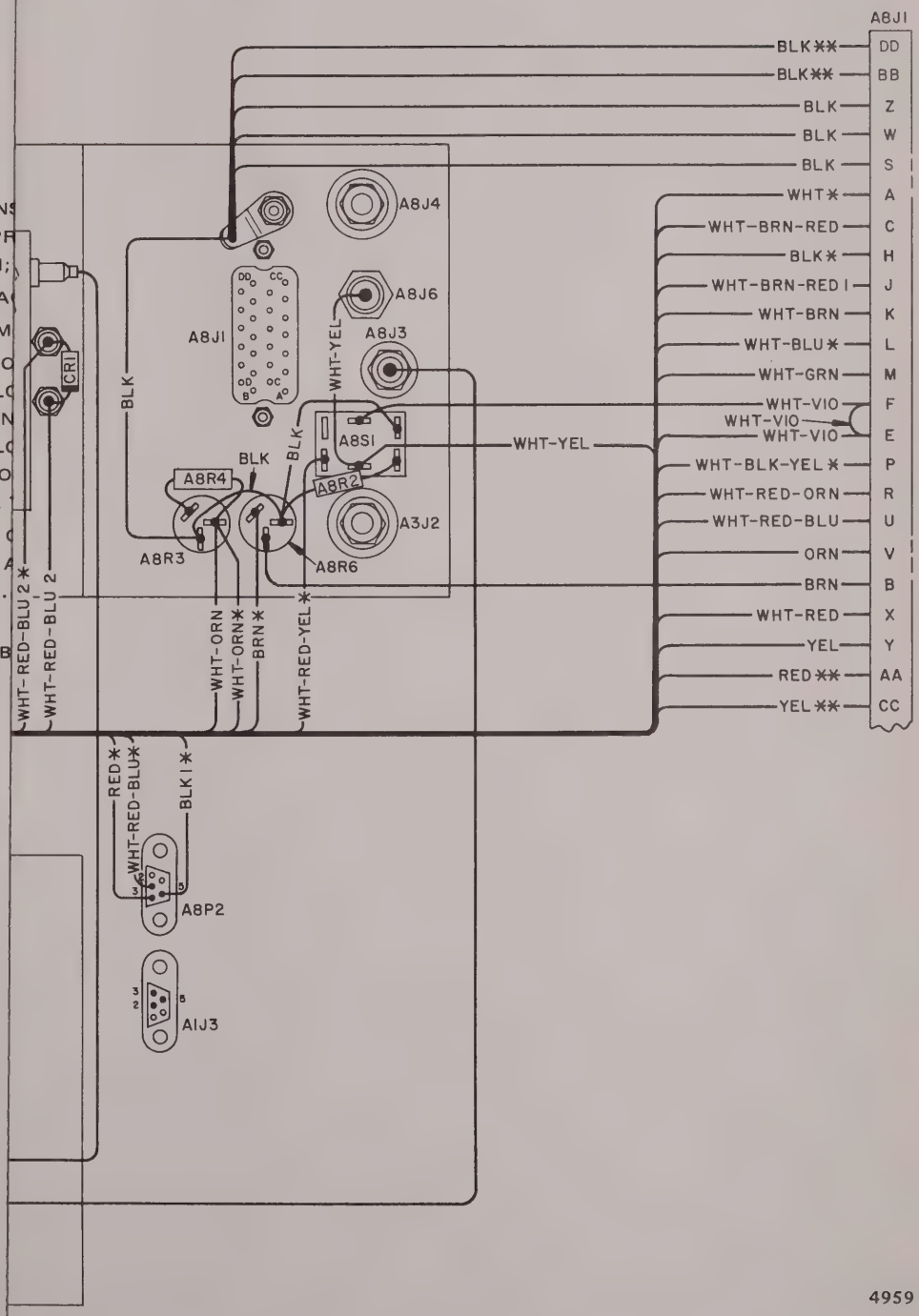


Figure 6–5. RTA-131B Accessory Unit, Main Wiring Diagram

NOTES:

1. REFERENCE DESIGNATIONS ARE ABBREVIATED. FOR COMPLETE IDENTIFICATION, PREFIX PART DESIGNATION WITH ASSEMBLY DESIGNATION; FOR EXAMPLE: A8C1, A6A1.
2. TO COMPLETE WIRING DIAGRAM, SEE FIGURE 6–6.
3. FOR SCHEMATIC DIAGRAM, SEE FIGURE 6–4.
4. WIRES MARKED WITH COLOR NOTE ARE NO. 22 AWG, STRANDED COPPER, TEFLON INSULATED. WIRES MARKED WITH COLOR NOTE AND AN ASTERISK (*) ARE NO. 24 AWG, STRANDED COPPER, TEFLON INSULATED. WIRES MARKED WITH COLOR NOTE AND DOUBLE ASTERISK (**) ARE NO. 18 AWG, STRANDED COPPER, TEFLON INSULATED.
5. FRONT AND BACK ENDS OF CHASSIS AND ASSEMBLY A5 ARE TURNED DOWN AND ASSEMBLIES A1, A6, AND A7 ARE DISPLACED FOR CLARITY.
6. ASSEMBLIES A2, A3, AND A4 AND RELAY A8K1 ARE NOT REPAIRABLE AND MUST BE REPLACED AS AN ASSEMBLY.

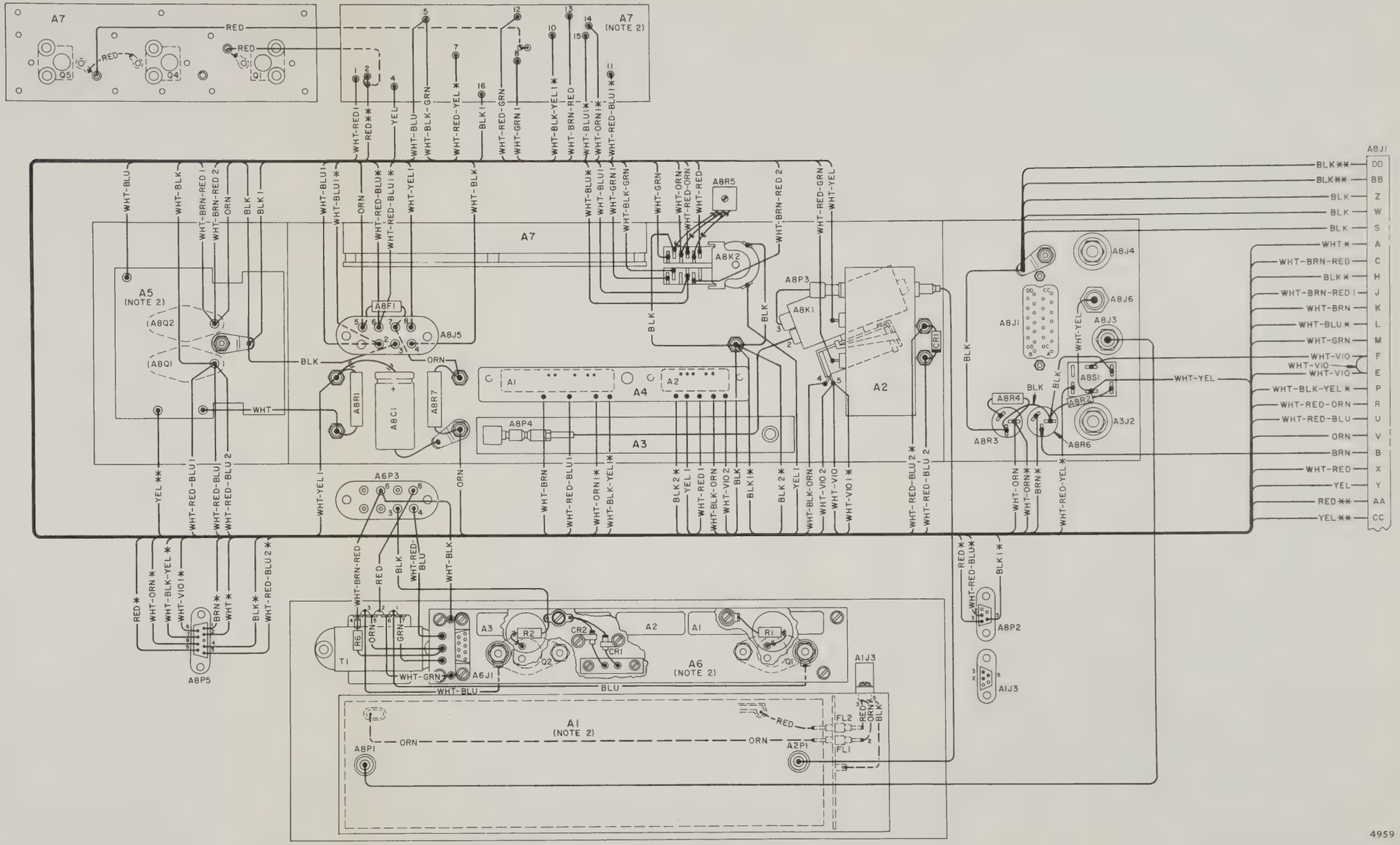
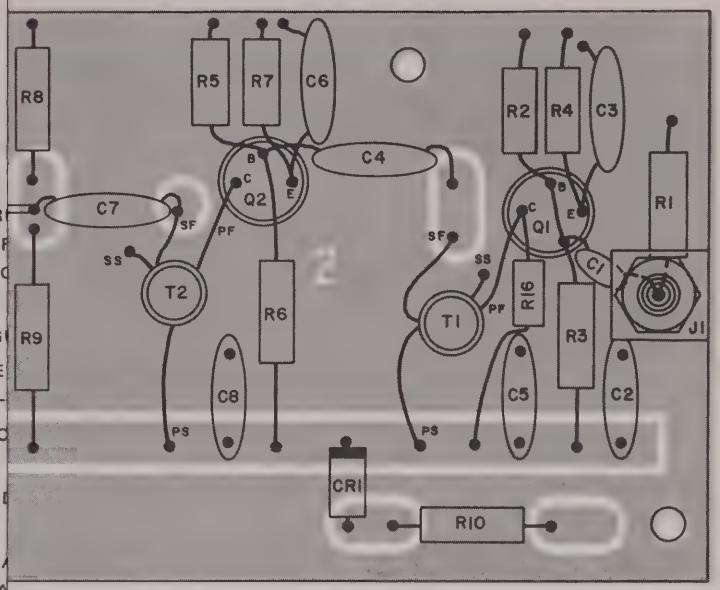
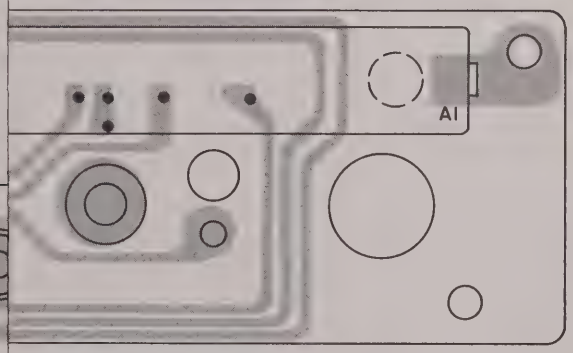


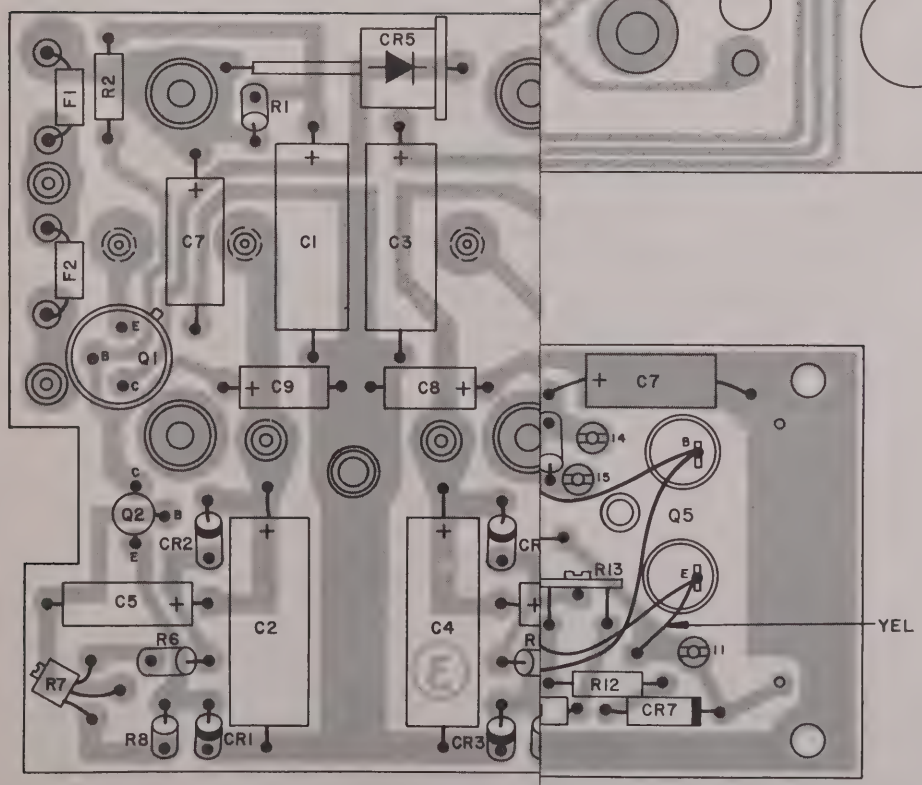
Figure 6–5. RTA-131B Accessory Unit, Main Wiring Diagram

NOTES:

1. REFERENCE DESIGNATIONS ARE ABBR
   FOR COMPLETE IDENTIFICATION, PREF
   DESIGNATION WITH ASSEMBLY DESIG
   FOR EXAMPLE: A1C1.
2. FOR MAIN WIRING DIAGRAM, SEE FIG
3. FOR SCHEMATIC DIAGRAM, SEE FIGURE
4. SHADED AREA DENOTES PRINTED PAT
   COMPONENT SIDE OF BOARD AND UNETC
   PER ON OPPOSITE SIDE OF BOARD.
5. ASSEMBLY A1 IS SHOWN WITH SHIEL
   REMOVED.
6. ASSEMBLIES A6A1, A6A2, AND A6A3 A
   REPAIRABLE AND MUST BE REPLACED A
   BLIES.
7. TO COMPLETE ASSEMBLIES A6 AND A7,
   URE 6–5.







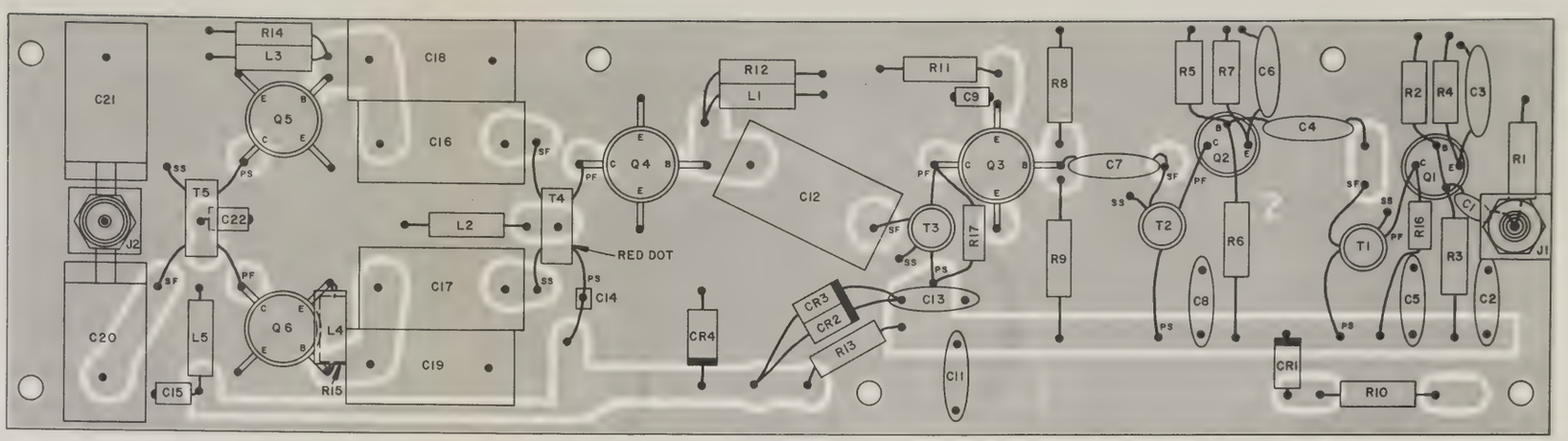
A5

4961

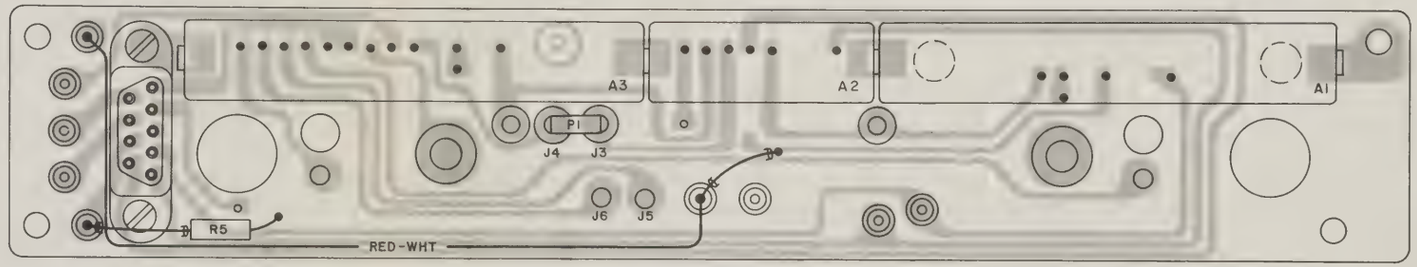
Figure 6–6. RTA-131B Accessory Unit, Printed Circuit Boards for Assemblies A1, A5, A6, and A7, Wiring Diagram

NOTES:

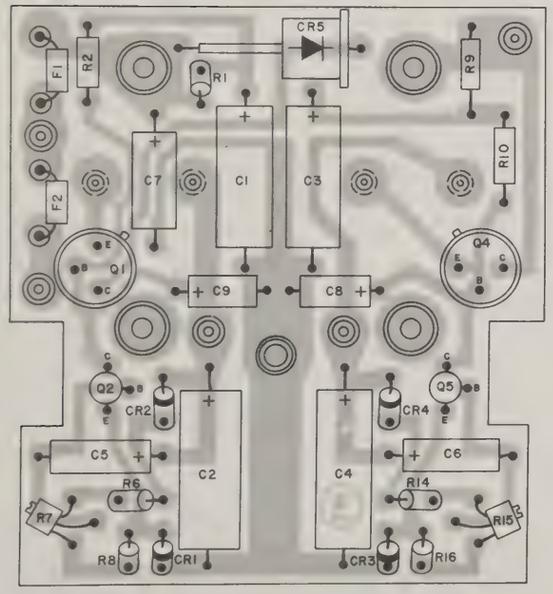
1. REFERENCE DESIGNATIONS ARE ABBREVIATED. FOR COMPLETE IDENTIFICATION, PREFIX PART DESIGNATION WITH ASSEMBLY DESIGNATION; FOR EXAMPLE: A1C1.
2. FOR MAIN WIRING DIAGRAM, SEE FIGURE 6–5.
3. FOR SCHEMATIC DIAGRAM, SEE FIGURE 6–4.
4. SHADED AREA DENOTES PRINTED PATTERN ON COMPONENT SIDE OF BOARD AND UNETCHED COPPER ON OPPOSITE SIDE OF BOARD.
5. ASSEMBLY A1 IS SHOWN WITH SHIELD COVER REMOVED.
6. ASSEMBLIES A6A1, A6A2, AND A6A3 ARE NOT REPAIRABLE AND MUST BE REPLACED AS ASSEMBLIES.
7. TO COMPLETE ASSEMBLIES A6 AND A7, SEE FIGURE 6–5.



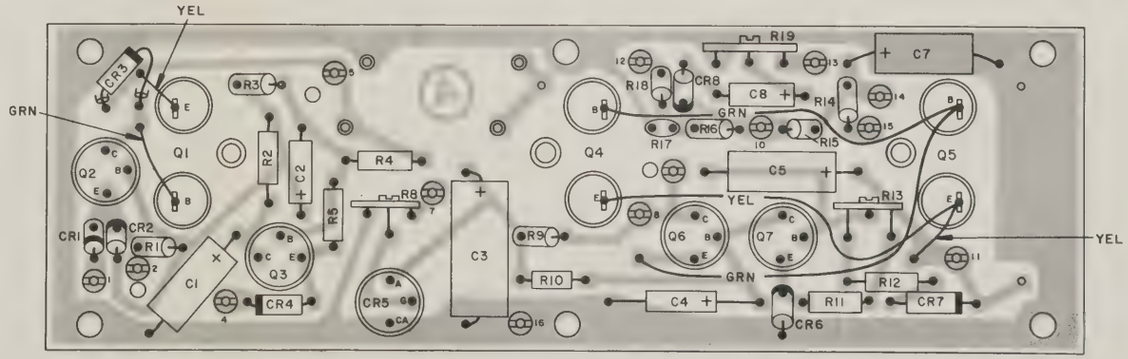
P/O A1



P/O A6



A5



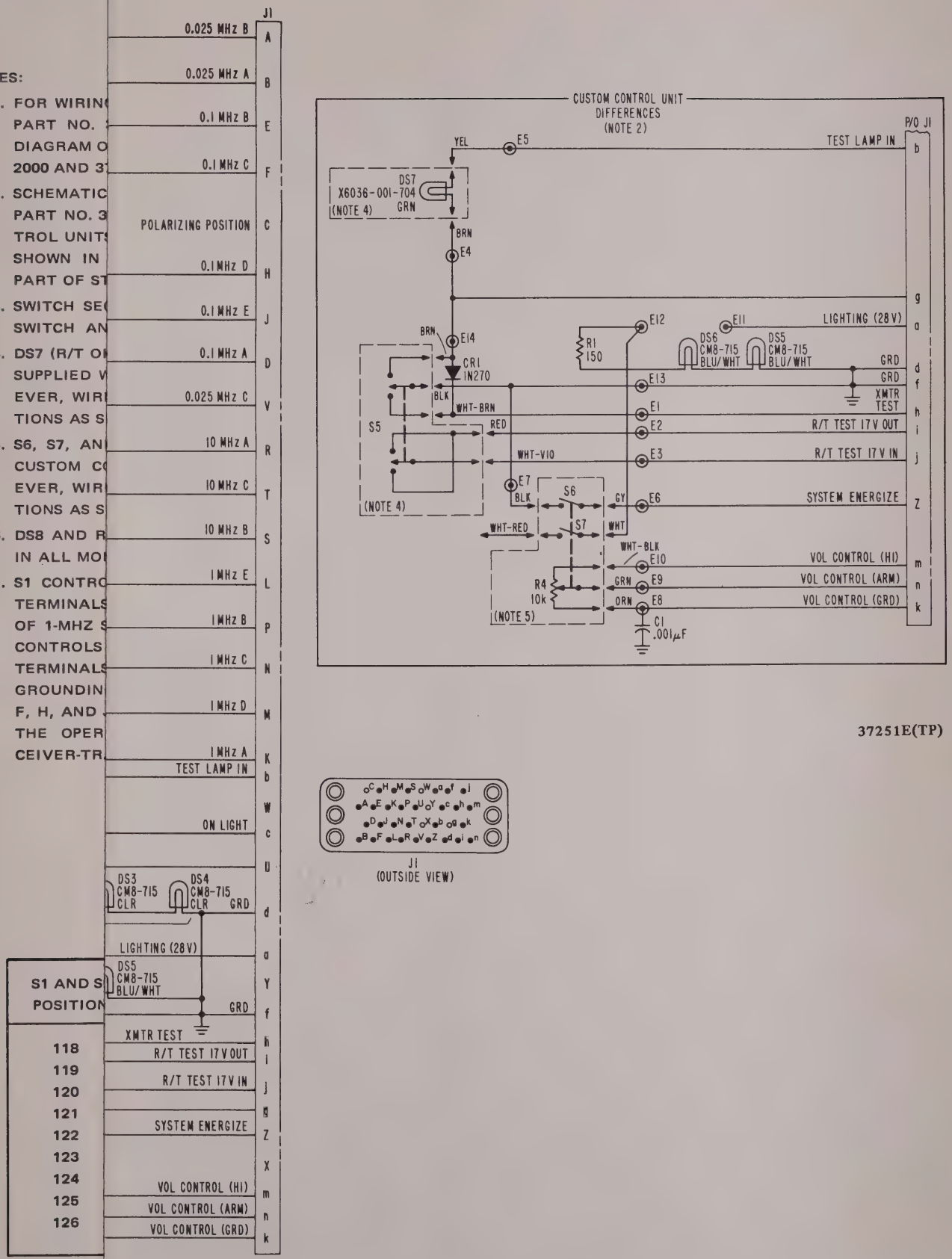
P/O A7

4961

Figure 6–6. RTA-131B Accessory Unit, Printed Circuit Boards for Assemblies A1, A5, A6, and A7, Wiring Diagram

NOTES:

1. FOR WIRIN
   PART NO.
   DIAGRAM O
   2000 AND 3
2. SCHEMATIC
   PART NO. 3
   TROL UNITS
   SHOWN IN
   PART OF ST
3. SWITCH SE
   SWITCH AN
4. DS7 (R/T O
   SUPPLIED W
   EVER, WIR
   TIONS AS S
5. S6, S7, AN
   CUSTOM C
   EVER, WIR
   TIONS AS S
6. DS8 AND R
   IN ALL MO
7. S1 CONTRO
   TERMINALS
   OF 1-MHZ S
   CONTROLS
   TERMINALS
   GROUNDIN
   F, H, AND
   THE OPER
   CEIVER-TR

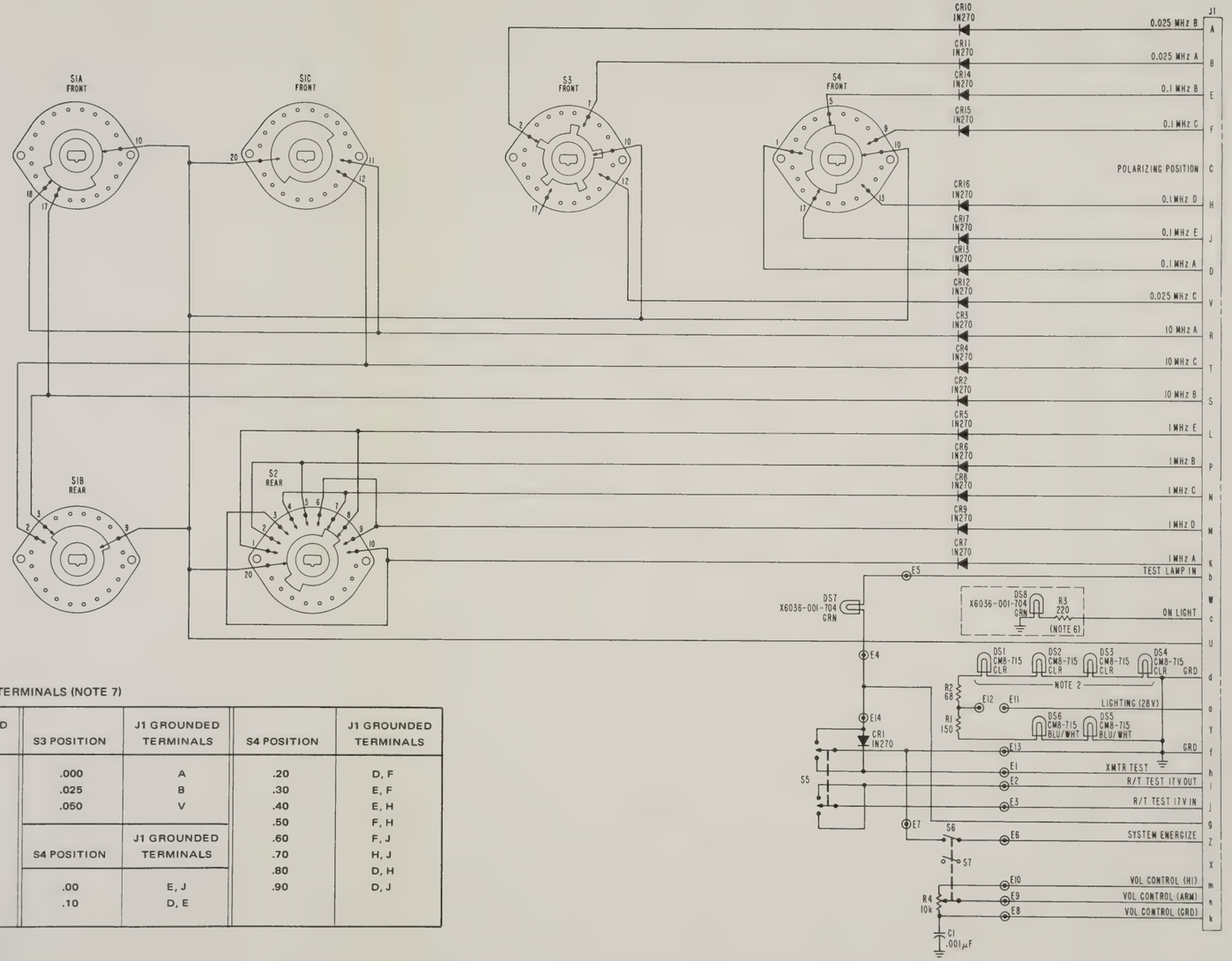


37251E(TP)

Figure 6–7. C-131A Control Unit, Schematic Diagram

NOTES:

1. FOR WIRING DIAGRAM OF STANDARD CONTROL UNIT, PART NO. 37250-0000, SEE FIGURE 6–8. FOR WIRING DIAGRAM OF CUSTOM CONTROL UNITS, PART NO. 37250-2000 AND 37250-3000, SEE FIGURE 6–9.
2. SCHEMATIC SHOWN IS FOR STANDARD CONTROL UNIT, PART NO. 37250-0000. DIFFERENCES FOR CUSTOM CONTROL UNITS, PART NO. 37250-2000 AND 37250-3000, ARE SHOWN IN DETAIL DRAWING. DS1–DS4 AND R2 ARE PART OF STANDARD CONTROL UNIT ONLY.
3. SWITCH SECTIONS ARE VIEWED FROM KNOB END OF SWITCH AND ARE SHOWN IN 116.000 MHZ POSITION.
4. DS7 (R/T OK LAMP) AND S5 (R/T TEST SWITCH) ARE NOT SUPPLIED WITH EITHER CUSTOM CONTROL UNIT; HOWEVER, WIRING IS PROVIDED FOR EXTERNAL CONNECTIONS AS SHOWN IN DETAIL.
5. S6, S7, AND R4 (VOL-OFF) ARE NOT SUPPLIED WITH CUSTOM CONTROL UNIT, PART NO. 37250-3000; HOWEVER, WIRING IS PROVIDED FOR EXTERNAL CONNECTIONS AS SHOWN IN DETAIL.
6. DS8 AND R3 AND ASSOCIATED WIRING NOT INCLUDED IN ALL MODELS.
7. S1 CONTROLS THE GROUNDING OF 10-MHZ SELECTOR TERMINALS R, S, AND T; S2 CONTROLS THE GROUNDING OF 1-MHZ SELECTOR TERMINALS K, L, M, N, AND P; S3 CONTROLS THE GROUNDING OF 0.025-MHZ SELECTOR TERMINALS A, B, AND V; AND S4 CONTROLS THE GROUNDING OF 0.1-MHZ SELECTOR TERMINALS D, E, F, H, AND J (SEE TABLE), THESE TERMINALS CONTROL THE OPERATING FREQUENCY OF THE RT-131A RECEIVER-TRANSMITTER.

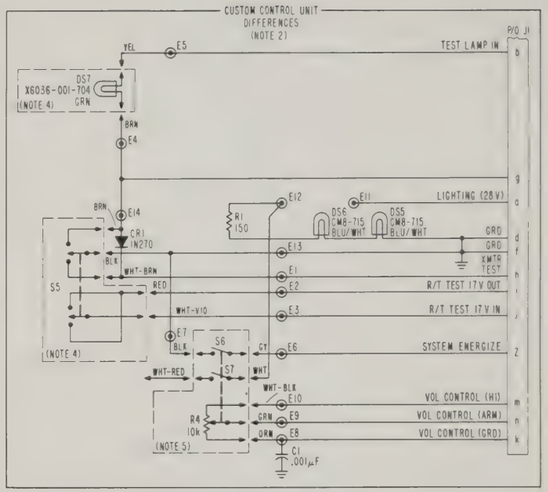


GROUNDED TERMINALS (NOTE 7)

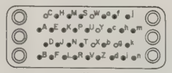
S1 AND S2 POSITION	J1 GROUNDED TERMINALS	S1 AND S2 POSITION	J1 GROUNDED TERMINALS
118	R, S, K, M	127	R, T, M, L
119	R, S, K, L	128	R, T, K, M
120	R, T, P, L	129	R, T, K, L
121	R, T, K, P	130	S, T, P, L
122	R, T, K, N	131	S, T, K, P
123	R, T, P, N	132	S, T, K, N
124	R, T, P, M	133	S, T, P, N
125	R, T, N, M	134	S, T, P, M
126	R, T, N, L	135	S, T, N, M

S3 POSITION	J1 GROUNDED TERMINALS
.000	A
.025	B
.050	V

S4 POSITION	J1 GROUNDED TERMINALS
.00	E, J
.10	D, E
.20	D, F
.30	E, F
.40	E, H
.50	F, H
.60	F, J
.70	H, J
.80	D, H
.90	D, J



37251E(TP)



J1 (OUTSIDE VIEW)

Figure 6–7. C-131A Control Unit, Schematic Diagram

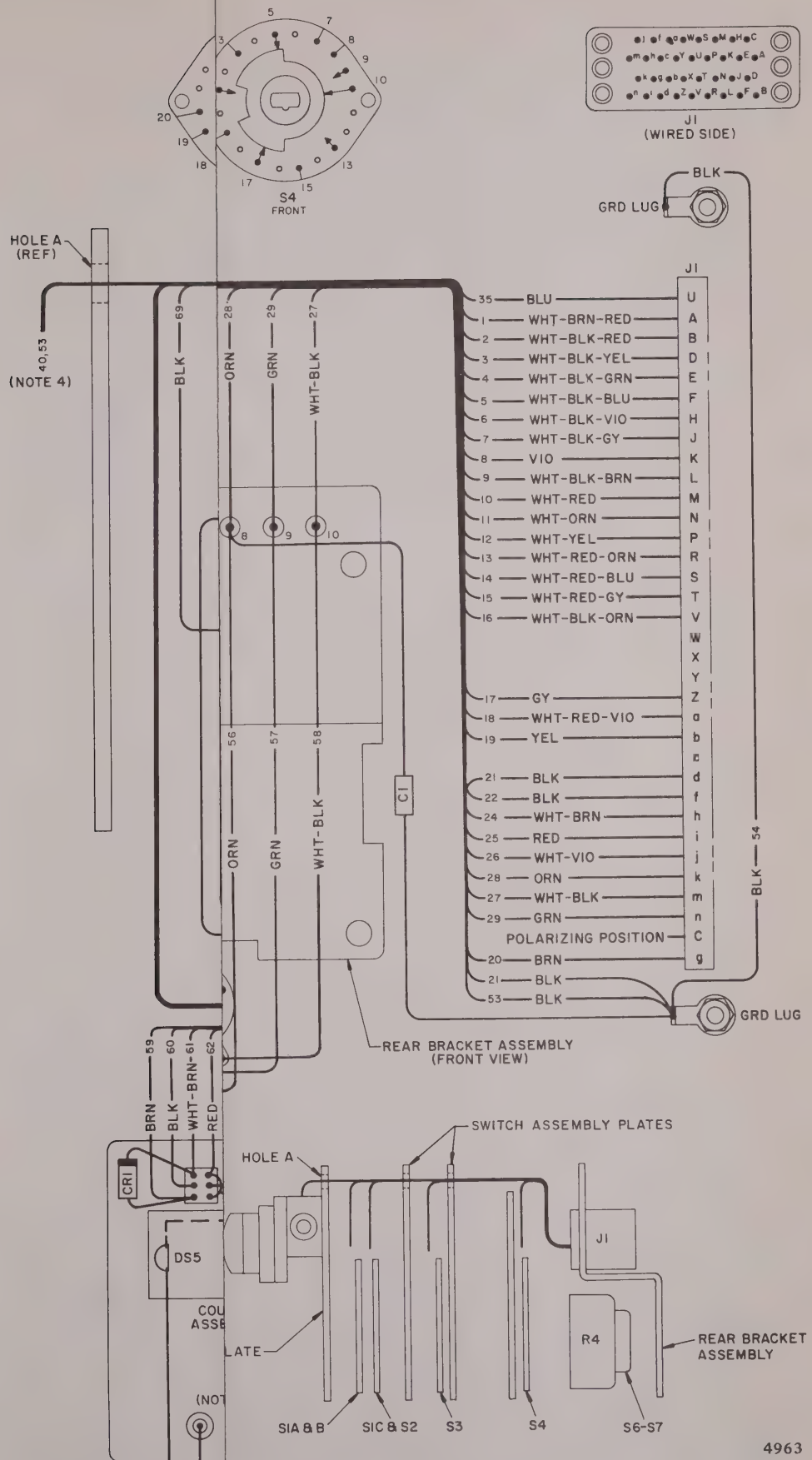
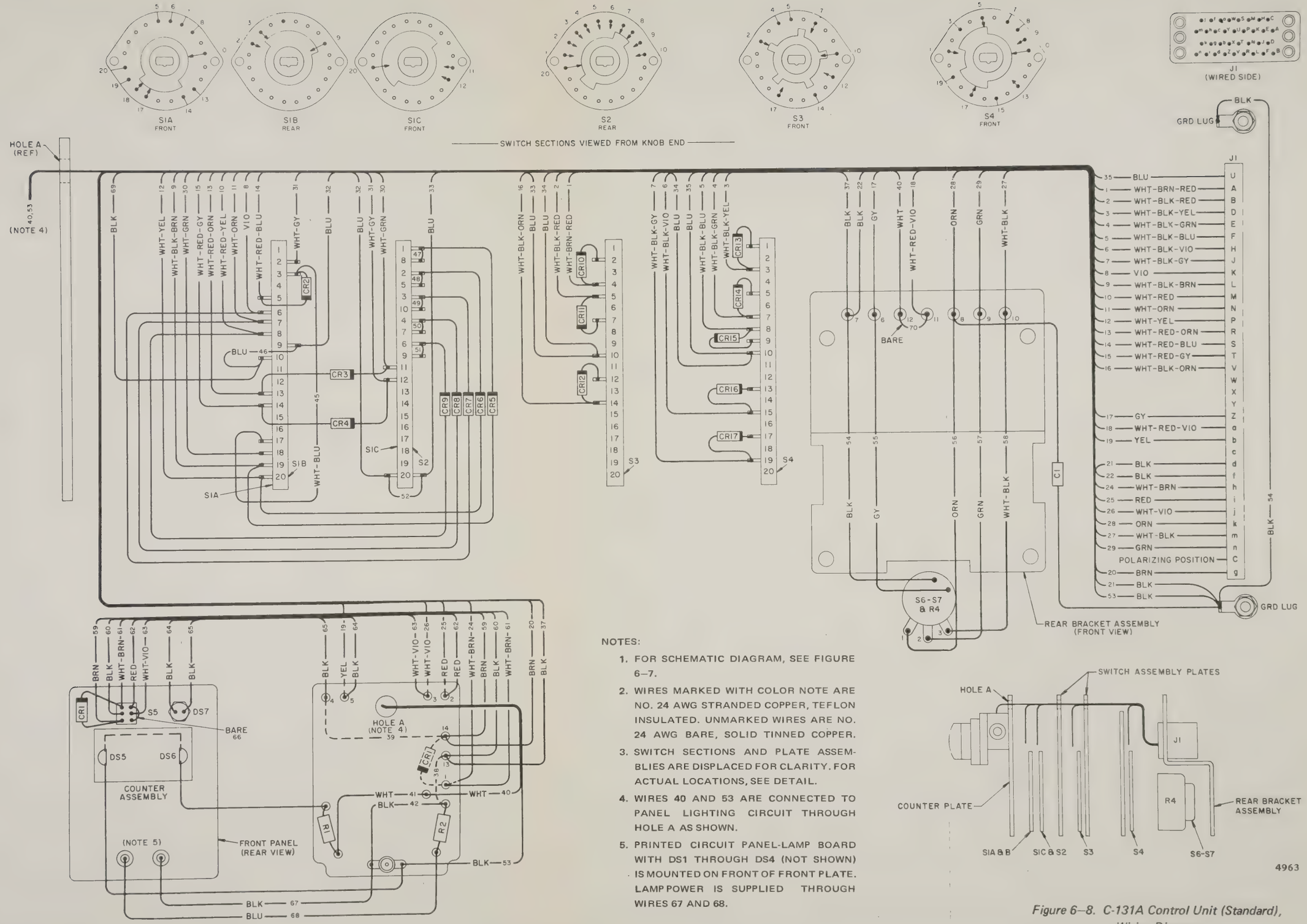


Figure 6–8. C-131A Control Unit (Standard), Wiring Diagram



NOTES:

1. FOR SCHEMATIC DIAGRAM, SEE FIGURE 6–7.
2. WIRES MARKED WITH COLOR NOTE ARE NO. 24 AWG STRANDED COPPER, TEFLON INSULATED. UNMARKED WIRES ARE NO. 24 AWG BARE, SOLID TINNED COPPER.
3. SWITCH SECTIONS AND PLATE ASSEMBLIES ARE DISPLACED FOR CLARITY. FOR ACTUAL LOCATIONS, SEE DETAIL.
4. WIRES 40 AND 53 ARE CONNECTED TO PANEL LIGHTING CIRCUIT THROUGH HOLE A AS SHOWN.
5. PRINTED CIRCUIT PANEL-LAMP BOARD WITH DS1 THROUGH DS4 (NOT SHOWN) IS MOUNTED ON FRONT OF FRONT PLATE. LAMP POWER IS SUPPLIED THROUGH WIRES 67 AND 68.

Figure 6–8. C-131A Control Unit (Standard), Wiring Diagram

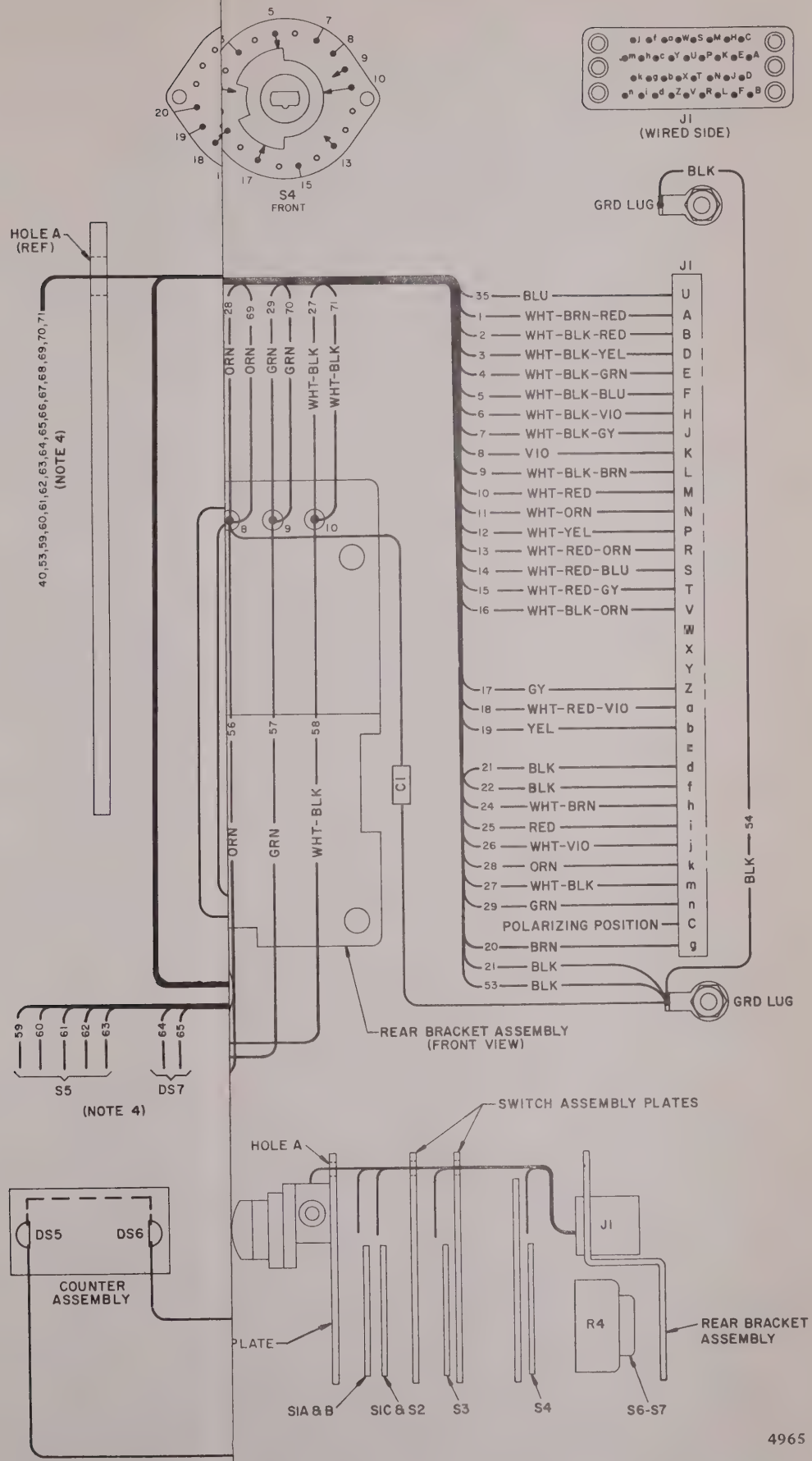
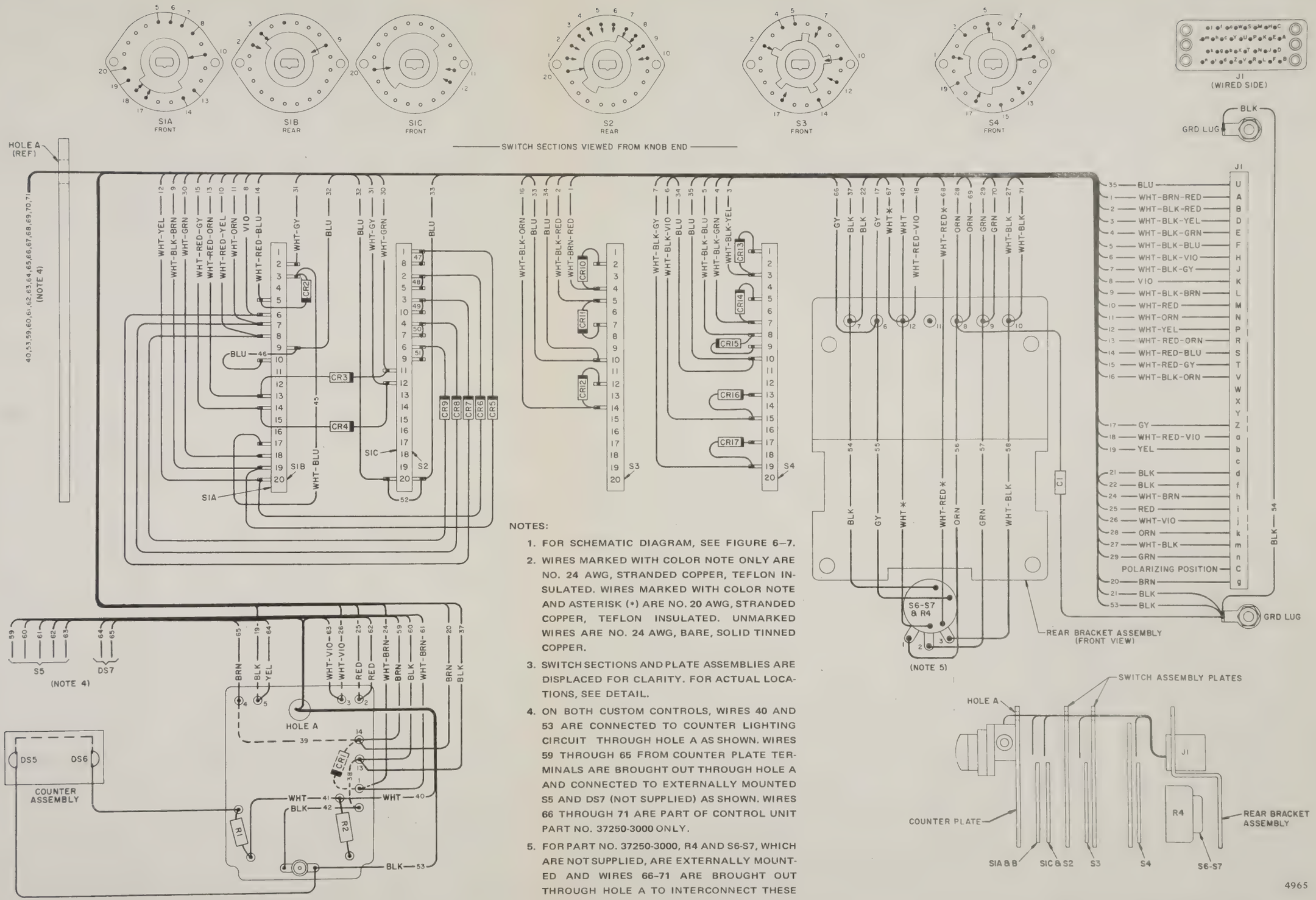


Figure 6–9. C-131A Control Unit (Custom), Wiring Diagram



NOTES:

1. FOR SCHEMATIC DIAGRAM, SEE FIGURE 6–7.
2. WIRES MARKED WITH COLOR NOTE ONLY ARE NO. 24 AWG, STRANDED COPPER, TEFLON INSULATED. WIRES MARKED WITH COLOR NOTE AND ASTERISK (*) ARE NO. 20 AWG, STRANDED COPPER, TEFLON INSULATED. UNMARKED WIRES ARE NO. 24 AWG, BARE, SOLID TINNED COPPER.
3. SWITCH SECTIONS AND PLATE ASSEMBLIES ARE DISPLACED FOR CLARITY. FOR ACTUAL LOCATIONS, SEE DETAIL.
4. ON BOTH CUSTOM CONTROLS, WIRES 40 AND 53 ARE CONNECTED TO COUNTER LIGHTING CIRCUIT THROUGH HOLE A AS SHOWN. WIRES 59 THROUGH 65 FROM COUNTER PLATE TERMINALS ARE BROUGHT OUT THROUGH HOLE A AND CONNECTED TO EXTERNALLY MOUNTED S5 AND DS7 (NOT SUPPLIED) AS SHOWN. WIRES 66 THROUGH 71 ARE PART OF CONTROL UNIT PART NO. 37250-3000 ONLY.
5. FOR PART NO. 37250-3000, R4 AND S6-S7, WHICH ARE NOT SUPPLIED, ARE EXTERNALLY MOUNTED AND WIRES 66–71 ARE BROUGHT OUT THROUGH HOLE A TO INTERCONNECT THESE CONTROLS TO THE CONTROL UNIT.

Figure 6–9. C-131A Control Unit (Custom), Wiring Diagram

SECTION VII
PARTS LISTS

7–1. GENERAL.

This section lists and describes the replaceable parts for the RT-131A Receiver-Transmitter, RTA-131B Accessory Unit, and C-131A Control Unit.

7–2. RT-131A RECEIVER-TRANSMITTER AND RTA-131B ACCESSORY UNIT

The parts for the RT-131A Receiver-Transmitter and RTA-131B Accessory Unit are listed in an alphabetical-numerical sequence of the reference designations assigned to the parts on the schematic diagrams. The reference designations as shown are abbreviated; for the complete designation, prefix the designation shown with the assembly designation included at the beginning of each list. For example, the complete reference designation for Mixer Assembly A3 in the RF Assembly A1 would be A1A3, and that for Capacitor C1 in the Mixer Assembly would be A1A3C1. The location of a part by its reference designation may be determined by referring to the applicable assembly wiring diagram or parts location diagram, Figures 6–2 and 6–3 for the RT-131A and Figures 6–5 and 6–6 for the RTA-131B.

Within each assembly parts list, complete information is given for a part listed for the first time. Subsequent listings of the same part within the same assembly are referred back to the original listing.

7–3. C-131A CONTROL UNIT.

The parts for the C-131A Control Unit are listed in a recommended order of disassembly, except for attaching parts which are listed directly after the part attached. Index numbers are assigned in sequence to each part and are keyed to an exploded view, Figure 7–1. Where only certain parts of an assembly are procurable, these are preceded by the caption "Partial Breakdown Follows." For cross-reference, a part number numerical index and a reference designation index are included following the parts list.

7–4. MANUFACTURERS' CODES AND PART NUMBERS

ARC part numbers are listed in a separate column in the parts lists. Other manufacturers' part numbers are identified by the manufacturer's numerical code (based on the Federal Supply Code for Manufacturers) and the manufacturer's part number. This information is listed either in a separate column or enclosed within parentheses at the end of the part description. The numerical codes used in the parts lists and the names and addresses of the manufacturers are as follows:

Code	*Name and Address*
00656	Aerovox Corp. 740 Belleville Avenue New Bedford, Massachusetts 02741
01121	Allen-Bradley Co. 1201 South 2nd Street Milwaukee, Wisconsin 53204
01281	TRW Semiconductors, Inc. 14520 Aviation Blvd. Lawndale, California 90260
01295	Texas Instruments, Inc. Semiconductor-Components Division 13500 North Central Expressway Dallas, Texas 75231
02006	United States Radium Corp. 4150 Old Berwick Road Bloomsburg, Pennsylvania 17815
02660	Amphenol Corp. 2801 South 25th Avenue Broadview, Illinois 60153
04713	Motorola Semiconductor Products, Inc. 5005 East McDowell Road Phoenix, Arizona 85008
06776	Robinson Nugent, Inc. 802 East 8th Street P. O. Box 486 New Albany, Indiana 47150
09214	General Electric Co. Semiconductor Products Department West Genesee Street Auburn, New York 31022
12040	National Semiconductor Corp. Commerce Drive P. O. Box 443 Danbury, Connecticut 06810

Code	Name and Address
12969	Unitrode Corp. 580 Pleasant Street Watertown, Massachusetts
25403	Amperex Electronic Corp. Semiconductor and Receiving Tube Division Providence Pike Slatersville, Rhode Island 02876
44655	Ohmite Manufacturing Co. 3601 West Howard Street Skokie, Illinois 60076
56289	Sprague Electric Co. 367 Marshall Street North Adams, Massachusetts 01247
71468	ITT Cannon Electric, Inc. 3208 Humbolt Street Los Angeles, California 90031
71590	Centralab Division of Globe-Union, Inc. 932 East Keefe Avenue Milwaukee, Wisconsin 53212
71744	Chicago Miniature Lamp Works 4433 Ravenswood Avenue Chicago, Illinois 60640
72136	Electro Motive Manufacturing Co., Inc. South Park and John Streets Willimantic, Connecticut 06226
72259	Nytronics, Inc. 550 Springfield Avenue Berkeley Heights, New Jersey 07922
72765	Drake Manufacturing Co. 4626 North Olcott Avenue Harwood Heights, Illinois 60656
72982	Erie Technological Products, Inc. 644 West 12th Street Erie, Pennsylvania 16512
73445	Amperex Electronic Corp. 230 Duffy Avenue Hicksville, Long Island, New York 11801
74868	Amphenol Corp. Amphenol RF Division 33 East Franklin Street Danbury, Connecticut 06810
74970	E. F. Johnson Co. 297 10th Avenue South West Waseca, Minnesota 56093
75915	Littelfuse, Inc. 800 East Northwest Highway Des Plains, Illinois 60016
77342	American Machine and Foundry Co. Potter and Brumfield Division 1200 East Broadway Princeton, Indiana 47570
78189	Shakeproof Division of Illinois Tool Works, Inc. 1955 St. Charles Road Elgin, Illinois 60120
78488	Stackpole Carbon Co. St. Marys, Pennsylvania 15857
79089	Radio Corp. of America Solid State and Receiving Tube Division 415 South 5th Street Harrison, New Jersey 07029
79136	Waldes Kohinoor, Inc. 47-16 Austel Place Long Island City, New York 11101
80223	United Transformer Co. 150 Varick Street New York, New York 10013
80740	Beckman Instruments, Inc. 2500 Harbor Blvd. Fullerton, California 92634
81312	Winchester Electronics Division Litton Industries, Inc. Main Street and Hillside Avenue Oakville, Connecticut 06779
90634	Gulton Industries, Inc. 212 Durham Avenue Metuchen, New Jersey 08840
91662	Elco Corp. Maryland Road and Computer Avenue Willow Grove, Pennsylvania 19090
93332	Sylvania Electric Products, Inc. Semiconductor Products Division 100 Sylvan Road Woburn, Massachusetts 01801
95105	Collins Radio Co. Components Division 19700 Jamboree Road P. O. Box C Newport Beach, California 92660
95146	Alco Electronics Products, Inc. 3 Wolcott Avenue Lawrence, Massachusetts 01843
95712	Dage Electric Co., Inc. Hurricane Road Franklin, Indiana 46131
98291	Sealectro Corp. 225 Hoyt Street Mamaroneck, New York 10544

RT-131A RECEIVER-TRANSMITTER

Reference Designation	Description	ARC Part No.	Manufacturer & Part No.	
	R-F ASSEMBLY A1 (36422)			
A1	SELF-TEST ASSEMBLY	36417		
A2	RF AMPLIFIER ASSEMBLY	35768		
A3	MIXER ASSEMBLY	35769		
	SELF-TEST ASSEMBLY A1A1 (36417)			
C1	CAPACITOR, Fixed, ceramic, 10 pF ±5%, 75 Vdc	29597-0100		
C2	Same as C1			
C3	CAPACITOR, Fixed, ceramic, 5 pF ±5%, 75 Vdc	29597-9501		
C4	CAPACITOR, Fixed, ceramic, 18 pF ±5%, 75 Vdc	29597-0180		
C5	CAPACITOR, Fixed, ceramic, 1000 pF ±10% 200Vdc	30949-0102		
C6	CAPACITOR, Fixed, ceramic, feed-thru, 1000 pF, GMV, 500 Vdc	36463-7102	01121	type FW5N
C7	CAPACITOR, Fixed, ceramic, 43 pF ±5%, 75 Vdc	29597-0430		
C8	CAPACITOR, Fixed, ceramic, 22 pF ±5%, 75 Vdc	29597-0220		
C9	CAPACITOR, Fixed, ceramic, 120 pF ±10%, 100 Vdc	37336-0121	72982	390-000X5 PO 121K
C10	Same as C5			
C11	Same as C6			
C12	CAPACITOR, Fixed, electrolytic, 0.1 μF ±20%, 35 Vdc	21485-9102		
C13	Same as C12			
C14	CAPACITOR, Fixed, metallized plastic, 0.047μF ±10%, 250 Vdc	36054-1473	73445	type C280
C15	Same as C14			
CR1	SEMICONDUCTOR DEVICE, Diode	32433-0003	01295	1N914B
CR2	SEMICONDUCTOR DEVICE, Diode	34410	93332	1N270
L1	COIL, RF, 0.22 μH ±10%	35637-9222	72259	DD-0.22
L2	COIL, RF, 0.18 μH ±10%	35637-9182	72259	DD-0.18
L3	COIL, RF, 0.10 μH ±10%	35637-9102	72259	DD-0.10
L4	NOT USED			
L5	COIL, RF, 1 mH ±10%	35637-0102	72259	DD-1000
L6	COIL, RF, 10 μH ±10%	35637-0100	72259	DD-10.0
L7	Same as L5			
Q1	TRANSISTOR	35111-0005	79089	40245
Q2	TRANSISTOR	36102-0002	12040	2N3794
Q3	Same as Q2			
Q4	Same as Q2			
R1	RESISTOR, Fixed, comp, 4700 ohms ±10%, 1/8 W	199-1472	01121	BB4721
R2	Same as R1			

Reference Designation	Description	ARC Part No.	Manufacturer & Part No.	
	SELF-TEST ASSEMBLY A1A1 (36417)—Continued			
R3	RESISTOR, Variable, 0 to 500 ohms ±30%, 1/20 W	35634-0501	71590	type 621-1
R4	RESISTOR, Fixed, comp, 1000 ohms ±10%, 1/8 W	199-1102	01121	BB1211
R5	Same as R4			
R6	RESISTOR, Fixed, comp, 47 ohms ±10%, 1/8 W	199-1470	01121	BB4701
R7	Same as R4			
R8	RESISTOR, Fixed, comp, 10,000 ohms ±10%, 1/8 W	199-1103	01121	BB1031
R9	RESISTOR, Fixed, comp, 100,000 ohms ±10%, 1/8 W	199-1104	01121	BB1041
R10	Same as R8			
R11	RESISTOR, Fixed, comp, 15,000 ohms ±10%, 1/8 W	199-1153	01121	BB1531
R12	Same as R4			
R13	RESISTOR, Fixed, comp, 22,000 ohms ±10%, 1/8 W	199-1223	01121	BB2231
R14	Same as R13			
R15	RESISTOR, Fixed, comp, 1800 ohms ±10%, 1/8 W	199-1182	01121	BB1821
R16	Same as R4			
R17	Same as R6			
T1	TRANSFORMER, RF	37281		
Y1	CRYSTAL, Quartz, 23.025 MHz	36626-2302		
	R-F AMPLIFIER ASSEMBLY A1A2 (35768)			
C1	CAPACITOR, Fixed, ceramic, 10 pF ±5%, 75 Vdc	29597-0100		
C2	CAPACITOR, Fixed, ceramic, feed-thru, 1000 pF, GMV, 500 Vdc	36463-7102	01121	type FW5N
C3	CAPACITOR, Fixed, electrolytic, 1 μF ±20%, 35 Vdc	21485-9101		
C4	CAPACITOR, Fixed, ceramic, 470 pF ±10%, 200 Vdc	30949-0471		
C5	CAPACITOR, Fixed, ceramic, 1000 pF ±10%, 200 Vdc	30949-0102		
C6	CAPACITOR, Fixed, ceramic, 1500 pF ±10%, 200 Vdc	30949-0152		
C7	Same as C5			
C8	CAPACITOR, Fixed, electrolytic, 22 μF ±20%, 15 Vdc	8920-0220	56289	150D226X 0015B2
C9	Same as C2			
C10	Same as C4			
C11	CAPACITOR, Fixed, ceramic, 6 pF ±5%, 75 Vdc	29597-9601		
C12	CAPACITOR, Fixed, ceramic, 1.8 pF ±5%, 500 Vdc	8879-9181	78488	type GA
C13	CAPACITOR, Fixed, ceramic, 15 pF ±5%, 75 Vdc	29597-0150		
CR1	SEMICONDUCTOR DEVICE, Diode	32689-0005	01295	1N458
L1	COIL, RF, 0.10 μH ±10%	35637-9102	72259	DD-0.10
L2	COIL, RF, 0.15 μH ±10%	35637-9152	72259	DD-0.15
L3	COIL, RF, 0.18 μH ±10%	35637-9182	72259	DD-0.18
L4	Same as L2			

Reference Designation	Description	ARC Part No.	Manufacturer & Part No.
	R-F AMPLIFIER ASSEMBLY A1A2 (35768) — Continued		
Q1	TRANSISTOR	39094	25403 A466
R1	RESISTOR, Fixed, comp, 100 ohms ±10%, 1/8 W	199-1101	01121 BB1011
R2	RESISTOR, Fixed, comp, 47 ohms ±10%, 1/8 W	199-1470	01121 BB4701
R3	RESISTOR, Fixed, comp, 220 ohms ±10%, 1/8 W	199-1221	01121 BB2211
R4	RESISTOR, Fixed, comp, 1800 ohms ±10%, 1/8 W	199-1182	01121 BB1821
R5	RESISTOR, Fixed, comp, 3300 ohms ±10%, 1/8 W	199-1332	01121 BB3321
R6	RESISTOR, Fixed, comp, 6800 ohms ±10%, 1/8 W	199-1682	01121 BB6821
R7	RESISTOR, Fixed, comp, 680 ohms ±10%, 1/8 W	199-1681	01121 BB6811
R8	RESISTOR, Fixed, comp, 2700 ohms ±10%, 1/8 W	199-1272	01121 BB2721
R9	RESISTOR, Fixed, comp, 330 ohms ±10%, 1/8 W	199-1331	01121 BB3311
R10	Same as R8		
R11	RESISTOR, Fixed, comp, 470 ohms ±10%, 1/8 W	199-1471	01121 BB4711
	MIXER ASSEMBLY A1A3 (35769)		
C1	CAPACITOR, Fixed, ceramic, 68 pF ±5%, 75 Vdc	29597-0680	
C2	CAPACITOR, Fixed, electrolytic, 1 μF ±20%, 35 Vdc	21485-9101	
C3	CAPACITOR, Fixed, ceramic, 1000 pF ±10%, 200 Vdc	30949-0102	
C4	CAPACITOR, Fixed, ceramic, feed-thru, 1000 pF, GMV, 500 Vdc	36463-7102	01121 type FW5N
C5	Same as C3		
C6	Same as C2		
C7	CAPACITOR, Fixed, ceramic, 6 pF ±5%, 75 Vdc	29597-9601	
C8	CAPACITOR, Fixed, ceramic, 22 pF ±5%, 75 Vdc	29597-0220	
C9	CAPACITOR, Variable, air dielectric, 1.5 to 7.3 μF	36105-0353	74970 189-353-5
C10	CAPACITOR, Variable, ceramic, 4.5 to 20 pF +70 —10%, 160 Vdc	36432	
C11	Same as C2		
CR1	SEMICONDUCTOR DEVICE, Diode	32689-0005	01295 1N458
J1	CONNECTOR, Receptacle, electrical	36631	98291 51-012-0000
J2	CONNECTOR, Receptacle, electrical	37242	98291 51-745-0000-2G
L1	COIL, RF, 0.22 μH ±10%	35637-9222	72259 DD-0.22
L2	COIL, RF, 1 μH ±10%	35637-9101	72259 DD-1.00
L3	Same as L2		
L4	COIL, RF, 1000 μH ±10%	35637-0102	72259 DD-1000
L5	COIL, RF, 0.10 μH ±10%	35637-9102	72259 DD-0.10
L6	Same as L5		
Q1, Q2	TRANSISTORS, Matched pair, two type 2N3819 transistors	39037	01295 SFB8084
R1	RESISTOR, Variable, 0 to 1000 ohms ±30%, 1/2 W	35955-0102	80740 type 62P

Reference Designation	Description	ARC Part No.	Manufacturer & Part No.
	MIXER ASSEMBLY A1A3 (35769)—Continued		
R2	RESISTOR, Fixed, comp, 1000 ohms ± 10%, 1/8 W	199-1102	01121 BB1021
R3	RESISTOR, Variable, 0 to 500 ohms ±30%, 1/2 W	35955-0501	80740 type 62P
R4	RESISTOR, Fixed, comp, 330 ohms ±10%, 1/8 W	199-1331	01121 BB3311
R5	Same as R2		
R6	RESISTOR, Fixed, comp, 47 ohms ±10%, 1/8 W	199-1470	01121 BB4701
	IF ASSEMBLY A2 (36317)		
A1	1ST IF AMPLIFIER ASSEMBLY, Microcircuit	37108	
A2	2ND MIXER OSCILLATOR ASSEMBLY, Microcircuit	37107	
A3	2ND IF AMPLIFIER ASSEMBLY, Microcircuit	37106	
A4	AGC ASSEMBLY, Microcircuit	37105	
A5	AUDIO COMPRESSOR ASSEMBLY, Microcircuit	37104	
A6	SQUELCH ASSEMBLY, Microcircuit	37103	
A7	AUDIO AMPLIFIER ASSEMBLY, Microcircuit	38121	
C1	CAPACITOR, Fixed, ceramic, 0.1 μF + 80 −20%, 25Vdc	29294-9102	
J1	CONNECTOR, Receptacle, electrical	35544-1012	91662 type 8129
P1	CONNECTOR, Plug, electrical	37239	98291 51-728-0000-2G
T1	TRANSFORMER, Audio, transistor, 500 mW, 49 V	37264	80223 type DO-T22
Z1	FILTER, Band pass	38929	
	REGULATOR ASSEMBLY A3 (35778)		
C1	CAPACITOR, Fixed, electrolytic, 33 μF ±20%, 10 Vdc	8919-0330	56289 150D336X0010B2
C2	CAPACITOR, Fixed, electrolytic, 15 μF ±20%, 20 Vdc	8914-0150	56289 150D156X0020B2
C3	CAPACITOR, Fixed, ceramic, 1000 pF ±10%, 200 Vdc	30949-0102	
C4	CAPACITOR, Fixed, electrolytic, 47 μF ±20%, 6 Vdc	8918-0470	56289 150D476X0006B2
C5	CAPACITOR, Fixed, electrolytic, 10 μF ±20%, 20 Vdc	8914-0100	56289 150D106X0020B2
C6	CAPACITOR, Fixed, electrolytic, 150 μF ±20%, 15 Vdc	8920-0151	56289 150D157X0015B2
CR1	SEMICONDUCTOR DEVICE, Diode	32689-0008	01295 1N459A
CR2 thru CR7	Same as CR1		

Reference Designation	Description	ARC Part No.	Manufacturer & Part No.
	REGULATOR ASSEMBLY A3 (35778)—Continued		
CR8	SEMICONDUCTOR DEVICE, Diode, Zener type	31477-9241	04713 1N4370A
P1	CONNECTOR, Plug, electrical	35029-1002	71468 DCM-27W2P
Q1	TRANSISTOR	36102-0002	12040 2N3794
Q2	TRANSISTOR	36371-3703	01295 2N3703
Q3	TRANSISTOR	36370-3054	79089 2N3054
Q4	Same as Q1		
Q5	Same as Q1		
Q6	Same as Q2		
Q7	Same as Q2		
R1	Resistor, Fixed, comp, 22,000 ohms ±5%, 1/4 W	341-0223	01121 CB2235
R2	RESISTOR, Fixed, comp, 4700 ohms ±5%, 1/4 W	341-0472	01121 CB4725
R3	RESISTOR, Fixed, comp, 10,000 ohms ±5%, 1/4 W	341-0103	01121 CB1035
R4	RESISTOR, Fixed, comp, 470 ohms ±5%, 1/4 W	341-0471	01121 CB4715
R5	Same as R2		
R6	RESISTOR, Fixed, comp, 330 ohms ±5%, 1/4 W	341-0331	01121 CB3315
R7	RESISTOR, Fixed, comp, 470,000 ohms ±5%, 1/4 W	341-0474	01121 CB4745
R8	RESISTOR, Fixed, comp, 100,000 ohms ±5%, 1/4 W	341-0104	01121 CB1045
R9	Same as R6		
R10	Same as R2		
R11	RESISTOR, Fixed, comp, 820 ohms ±5%, 1/4 W	341-0821	01121 CB8215
R12	RESISTOR, Fixed, comp, 1000 ohms ±5%, 1/4 W	341-0102	01121 CB1025
R13	RESISTOR, Fixed, comp, 560 ohms ±5%, 1/4 W	341-0561	01121 CB5615
R14	Same as R12		
R15	RESISTOR, Fixed, comp, 220 ohms ±5%, 1/4 W	341-0221	01121 CB2215
R16	RESISTOR, Fixed, comp, 150 ohms ±5%, 1/4 W	341-0151	01121 CB1515
R17	RESISTOR, Variable, 0 to 1000 ohms ±30%, 1/2 W	35955-0201	80740 type 62P
R18	RESISTOR, Fixed, comp, 180 ohms ±5%, 1/4 W	341-0181	01121 CB1815
R19	THERMISTOR, Wafer, 100 ohms ±10%	27607-0003	90634 21TE2
R20	RESISTOR, Fixed, comp, 12 ohms ±5%, 1/2 W	201-0120	01121 EB1205
R21	RESISTOR, Fixed, comp, 5600 ohms ±5%, 1/4 W	341-0562	01121 CB5625
R22	Same as R21		
R23	RESISTOR, Variable, 0 to 5000 ohms ±30%, 1/10 W	33868-0502	71590 CB601-1
Z1	NETWORK, Resistor	36374	
	SYNTHESIZER FREQUENCY ASSEMBLY A4 (38462)		
	Note The detail parts of this assembly are nonprocurable.		
	CHASSIS ASSEMBLY A5 (P/O 37260)		
C1	CAPACITOR, Fixed, ceramic, feed-thru, 1000 pF +80 −20%, 500 Vdc	8832-000	72982 type 2404

Reference Designation	Description	ARC Part No.	Manufacturer & Part No.	
	CHASSIS ASSEMBLY A5 (P/O 37260)—Continued			
C2 thru C16	Same as C1			
C17	NOT USED			
C18	NOT USED			
C19	CAPACITOR, Fixed, ceramic 0.001 μF +100—0%, 500 Vdc	8625-9104		
J1	CONNECTOR, Receptacle, electrical	35029-0002	71468	DCM27W25
J2	CONNECTOR, Receptacle, electrical, consisting of:			
	1 Connector body	35860-0126	81312	MRAC26P
	24 Contacts, electrical	35861-2120	81312	100-2020P
J3	CONNECTOR, Receptacle, electrical, consisting of:			
	1 Connector body	35860-0134	81312	MRAC34P
	30 Contacts, electrical	35861-2120	81312	100-2020P
J4	CONNECTOR, Receptacle, electrical	36225	74868	46825
J5	CONNECTOR, Receptacle, electrical	35101	95712	type 8050-3
P1	CONNECTOR, Plug, electrical	35544-0012	91662	type 8129
P2	CONNECTOR, Plug, electrical, consisting of:			
	1 Connector body	36453-0117	02660	type 223
	17 Contacts, electrical	35817-1101	02660	220-P02

RTA-131B ACCESSORY UNIT

Reference Designation	Description	ARC Part No.	Manufacturer & Part No.	
	TRANSMITTER-AMPLIFIER ASSEMBLY A1 (P/O 38511)			
C1	CAPACITOR, Fixed, ceramic, 1000 pF ±10%, 500 Vdc	31037-0102		
C2	Same as C1			
C3	Same as C1			
C4	CAPACITOR, Fixed, mica, 56 pF ±5%, 250 Vdc	36245-0560	72136	type DM10
C5	Same as C1			
C6	Same as C1			
C7	CAPACITOR, Fixed, mica, 62 pF ±5%, 250 Vdc	36245-0620	72136	type DM10
C8	Same as C1			
C9	CAPACITOR, Fixed, ceramic, 0.1 μF ±20%, 25 Vdc	37732-0104	00656	type ULA702
C10	NOT USED			
C11	Same as C1			
C12	CAPACITOR, Variable, mica, 7 to 100 pF, 175 Vdc	38310-1423	72136	423
C13	Same as C1			
C14	Same as C9			
C15	Same as C9			
C16 thru C19	Same as C12			
C20	CAPACITOR, Variable, mica, 24 to 200 pF, 175 Vdc	38310-1425	72136	425
C21	Same as C12			
C22	Same as C9			
CR1	SEMICONDUCTOR DEVICE, Diode	36293-0005	01295	1N645
CR2	Same as CR1			
CR3	Same as CR1			
CR4	SEMICONDUCTOR DEVICE, Diode, Zener type	36302-0330	12969	UZ5733
FL1	FILTER, Low pass, feed-thru, 1/4 A, 200 Vdc	27628	01121	type SMFO-2
FL2	Same as FL1			
J1	CONNECTOR, Receptacle, electrical	36943	98291	51-045-0000
J2	CONNECTOR, Receptacle, electrical	37282	98291	51-046-0000
J3	CONNECTOR, Receptacle, electrical, consisting of:			
	1 Connector body	36185-0105	02660	type 223
	5 Contacts, electrical	35817-1101	02660	220-PO2
L1	COIL, RF, 1.0 μH	34894-8101		
L2	COIL, RF, 6.8 μH	34894-8681		
L3	COIL, RF, 0.47 μH	34894-8472		
L4	Same as L3			
L5	COIL, RF, 0.1 μH	34894-8102		
Q1	TRANSISTOR	38205-0001	01281	PT3138AR
Q2	TRANSISTOR	38205-0002	01281	PT3138BR
Q3	TRANSISTOR	38205-0003	01281	PT3138CR
Q4	TRANSISTOR	38205-0004	01281	PT3138DR
Q5	TRANSISTOR	38205-0005	01281	PT3138ER

Reference Designation	Description	ARC Part No.	Manufacturer & Part No.
TRANSMITTER-AMPLIFIER ASSEMBLY A1 (P/O 38511)—Continued			
Q6	Same as Q5		
R1	RESISTOR, Fixed, comp, 47 ohms ±10%, 1/4 W	200-0470	01121 CB4701
R2	RESISTOR, Fixed, comp, 1800 ohms ±10%, 1/4 W	200-0182	01121 CB1821
R3	RESISTOR, Fixed, comp, 6800 ohms ±10%, 1/4 W	200-0682	01121 CB6821
R4	RESISTOR, Fixed, comp, 39 ohms ±10%, 1/4 W	200-0390	01121 CB3901
R5	RESISTOR, Fixed, comp, 220 ohms ±10%, 1/4 W	200-0221	01121 CB2211
R6	RESISTOR, Fixed, comp, 1000 ohms ±10%, 1/4 W	200-0102	01121 CB1021
R7	RESISTOR, Fixed, comp, 33 ohms ±10%, 1/4 W	200-0330	01121 CB3301
R8	RESISTOR, Fixed, comp, 130 ohms ±5%, 1/2 W	201-0131	01121 EB1315
R9	RESISTOR, Fixed, comp, 510 ohms ±5%, 1/2 W	201-0511	01121 EB5115
R10	RESISTOR, Fixed, comp, 20 ohms ±5%, 1/2 W	201-0200	01121 EB2005
R11	RESISTOR, Fixed, comp, 12 ohms ±5%, 1/2 W	201-0120	01121 EB1205
R12	RESISTOR, Fixed, comp, 75 ohms ±5%, 1/2 W	201-0750	01121 EB7505
R13	RESISTOR, Fixed, comp, 27 ohms ±5%, 1/2 W	201-0270	01121 EB2705
R14	RESISTOR, Fixed, comp, 100 ohms ±5%, 1/2 W	201-0101	01121 EB1015
R15	Same as R14		
R16	Same as R5		
R17	RESISTOR, Fixed, comp, 330 ohms ±10%, 1/4 W	200-0331	01121 CB3311
T1	TRANSFORMER, RF	38507	
T2	TRANSFORMER, RF	38506	
T3	TRANSFORMER, RF	38505	
T4	TRANSFORMER, RF	38393	
T5	TRANSFORMER, RF	38394	
FILTER AND SWR DETECTOR ASSEMBLY A2 (36812)			
Note The detail parts of this assembly are nonprocurable.			
FILTER ASSEMBLY, BAND PASS A3 (36461)			
Note The detail parts of this assembly are nonprocurable.			
RELAY DELAY AND SIGNAL SENSOR ASSEMBLY A4 (36936)			
A1	SENSOR ASSEMBLY, Signal	36896	
A2	DELAY ASSEMBLY, Relay	36897	

Reference Designation	Description	ARC Part No.	Manufacturer & Part No.
	PRINTED CIRCUIT ASSEMBLY, REGULATOR A5 (36859)		
C1	CAPACITOR, Fixed, electrolytic, 47 μF ±20%, 50 Vdc	8924-0470	56289 109D476X 0050F2
C2	CAPACITOR, Fixed, electrolytic, 47 μF ±20%, 35 Vdc	21485-0470	
C3	Same as C1		
C4	CAPACITOR, Fixed, electrolytic, 47 μF ±20%, 20 Vdc	34118-0470	56289 type 164D
C5	CAPACITOR, Fixed, electrolytic, 40 μF ±20%, 10 Vdc	8919-0400	56289 150D406X 0010B2
C6	Same as C5		
C7	CAPACITOR, Fixed, electrolytic, 6.8 μF ±20%, 35 Vdc	21485-9681	
C8	CAPACITOR, Fixed, electrolytic, 0.068 μF ±20%, 35 Vdc	21485-9683	
C9	Same as C8		
CR1	SEMICONDUCTOR DEVICE, Diode, Zener type	35954-0100	04713 1N4740A
CR2	SEMICONDUCTOR DEVICE, Diode, Zener type	31477-9681	04713 1N754A
CR3	Same as CR2		
CR4	Same as CR2		
CR5	SEMICONDUCTOR DEVICE, Diode	18723	09214 1N91
F1	FUSE, Instrument, 3 A	36968-3002	75915 276003
F2	Same as F1		
Q1	TRANSISTOR	34619-0000	79089 2N3053
Q2	TRANSISTOR	34086-0002	79089 40232
Q3	NOT USED		
Q4	Same as Q1		
Q5	Same as Q2		
R1	RESISTOR, Fixed, comp, 270 ohms ±10%, 1/4 W	200-0271	01121 CB2711
R2	RESISTOR, Fixed, comp, 160 ohms ±5%, 1/4 W	341-0161	01121 CB1615
R3 thru R5	NOT USED		
R6	RESISTOR, Fixed, comp, 39 ohms ±10%, 1/4 W	200-0390	01121 CB3901
R7	RESISTOR, Variable, 0 to 50 ohms ±30%, 1/2 W	35955-0500	80740 type 62P
R8	RESISTOR, Fixed, comp, 12 ohms ±10%, 1/4 W	200-0120	01121 CB1201
R9	RESISTOR, Fixed, comp, 330 ohms ±10%, 1/4 W	200-0331	01121 CB3311
R10	RESISTOR, Fixed, comp, 150 ohms ±10%, 1/4 W	200-0151	01121 CB1511
R11 thru R13	NOT USED		
R14	RESISTOR, Fixed, comp, 100 ohms ±10%, 1/4 W	200-0101	01121 CB1011
R15	RESISTOR, Variable, 0 to 100 ohms ±30%, 1/2 W	35955-0101	80740 type 62P
R16	RESISTOR, Fixed, comp, 27 ohms ±10%, 1/4 W	200-0270	01121 CB2701
	MODULATOR-AMPLIFIER ASSEMBLY A6 (P/O 38511)		
A1	LIMITER ASSEMBLY, Audio	37664	
A2	SWITCH ASSEMBLY, Audio	36898	
A3	AMPLIFIER ASSEMBLY, Audio	38290	

Reference Designation	Description	ARC Part No.	Manufacturer & Part No.
	MODULATOR-AMPLIFIER ASSEMBLY A6 (P/O 38511)		
CR1	SEMICONDUCTOR DEVICE, Diode	36632-4003	04713 1N4003
CR2	Same as CR1		
J1	CONNECTOR, Receptacle, electrical, consisting of:		
	1 Connector body	36185-0109	02660 type 223
	9 Contacts, electrical	35817-3101	02660 220-834-01
J2	NOT USED		
J3	JACK, Test, White	37286-0910	98291 type SKT 114PC
J4	Same as J3		
J5	SOCKET, Pin	36967-0011	06776 PS-404-40
J6	Same as J5		
P1	JUMPER, Disconnect	35103	
P2	PLATE ASSEMBLY	36838	
P3	CONNECTOR, Plug, electrical	37942	
Q1, Q2	TRANSISTORS, matched pair, two type 36370-0549 transistors	36370-0549	79089 36370-0549
R1	RESISTOR, Fixed, ww, 0.47 ohm ±10%, 3 W	30700-9472	56289 type 242E
R2	Same as R1		
R3	NOT USED		
R4	NOT USED		
R5	RESISTOR, Fixed, comp, 33 ohms ±5%, 1/2 W	201-0330	01121 EB3305
R6	RESISTOR, Fixed, comp, 180 ohms ±5%, 1 W	202-0181	01121 GB1815
	SWITCH ASSEMBLY, SOLID STATE A7 (38457)		
C1	CAPACITOR, Fixed, electrolytic, 6.8 μF ±20%, 35 Vdc	21485-9681	
C2	CAPACITOR, Fixed, electrolytic, 1 μF ±20%, 35 Vdc	21485-9101	
C3	CAPACITOR, Fixed, electrolytic, 47 μF ±20%, 50 Vdc	8924-0470	56289 109D476X 0050F2
C4	CAPACITOR, Fixed, electrolytic, 0.068 μF ±20%, 35 Vdc	21485-9683	
C5	CAPACITOR, Fixed, electrolytic, 40 μF ±20%, 10 Vdc	8919-0400	56289 150D406X 0010B2
C6	NOT USED		
C7	CAPACITOR, Fixed, electrolytic, 15 μF ±20%, 20 Vdc	8914-0150	56289 150D156X 0020B2
C8	CAPACITOR, Fixed, electrolytic, 4.7 μF ±20%, 10 Vdc	8919-9471	56289 150D475X 0010B2
CR1	SEMICONDUCTOR DEVICE, Diode	36615-1484	93332 1N484A
CR2 thru CR4	Same as CR1		
CR5	SEMICONDUCTOR DEVICE, Diode	37316-2323	09214 2N2323
CR6	SEMICONDUCTOR DEVICE, Diode, Zener type	31477-9561	04713 1N752A
CR7	Same as CR6		

Reference Designation	Description	ARC Part No.	Manufacturer & Part No.
	SWITCH ASSEMBLY, SOLID STATE A7 (38457)—Continued)		
CR8	SEMICONDUCTOR DEVICE, Diode	34410	93332 1N270
Q1	TRANSISTOR	38513-5036	79089 2N5036
Q2	TRANSISTOR	36613-4235	04713 2N4235
Q3	TRANSISTOR	34619-0000	79089 2N3053
Q4	Same as Q1		
Q5	Same as Q1		
Q6	Same as Q3		
Q7	Same as Q3		
R1	RESISTOR, Fixed, comp, 680 ohms ±10%, 1/4 W	200-0681	01121 CB6811
R2	RESISTOR, Fixed, comp, 1200 ohms ±10%, 1/4 W	200-0122	01121 CB1221
R3	RESISTOR, Fixed, comp, 68,000 ohms ±10%, 1/4 W	200-0683	01121 CB6831
R4	RESISTOR, Fixed, comp, 27,000 ohms ±10%, 1/4 W	200-0273	01121 CB2731
R5	Same as R2		
R6	NOT USED		
R7	NOT USED		
R8	RESISTOR, Variable, 50,000 ohms ±30%, 1/10 W	33868-0503	71590 type 601-1
R9	RESISTOR, Fixed, comp, 330 ohms ±10%, 1/4 W	200-0331	01121 CB3311
R10	RESISTOR, Fixed, comp, 150 ohms ±10%, 1/4 W	200-0151	01121 CB1511
R11	RESISTOR, Fixed, comp, 27 ohms ±10%, 1/4 W	200-0270	01121 CB2701
R12	RESISTOR, Fixed, comp, 100 ohms ±10%, 1/4 W	200-0101	01121 CB1011
R13	RESISTOR, Variable, 100 ohms ±30%, 1/10 W	33868-0101	71590 type 601-1
R14	Same as R10		
R15	RESISTOR, Fixed, comp, 10,000 ohms ±10%, 1/4 W	200-0103	01121 CB1031
R16	RESISTOR, Fixed, comp, 220 ohms ±10%, 1/4 W	200-0221	01121 CB2211
R17	THERMISTOR, Wafer, 100 ohms ±10%	27607-0003	90634 21TE2
R18	RESISTOR, Fixed, comp, 3300 ohms ±10%, 1/4 W	200-0332	01121 CB3321
R19	RESISTOR, Variable, 10,000 ohms ±30%, 1/10 W	23868-0103	71590 type 601-1
	CHASSIS ASSEMBLY A8 (P/O 38500)		
C1	CAPACITOR, Fixed, electrolytic, 1000 μF −10 +75%, 40 Vdc	35138-0102	56289 type 601D
CR1	SEMICONDUCTOR DEVICE, Diode, Zener type	36302-1120	12969 UZ5812
F1	FUSE, Instrument, 1.5 A	36968-1500	75915 27501.5
J1	CONNECTOR, Receptacle, electrical, consisting of:		
	1 Connector body	35860-0126	81312 MRAC26P
	20 Contacts, electrical	35861-2120	81312 100-2020P
	4 Contacts, electrical	35861-2118	81312 100-2018P
	1 Contact, electrical	35861-2116	81312 100-2016P
J2	NOT USED		
J3	CONNECTOR, Receptacle, electrical	36225	74868 46825
J4	CONNECTOR, Receptacle, electrical	35102	95712 9950-6
J5	CONNECTOR, Receptacle, electrical	37947	

Reference Designation	Description	ARC Part No.	Manufacturer & Part No.
	CHASSIS ASSEMBLY A8 (P/O 38500)—Continued		
J6	JACK, Tip, red	8803-0210	74970 105-602
K1	RELAY, Coaxial, SPDT, 24 Vdc	36362-0028	
K2	RELAY, 4 PDT, 24 Vdc	36360-0028	77342 MH80650
P1	CONNECTOR, Plug, electrical	36175	74868 type 27-843
P2	CONNECTOR, Plug, electrical, consisting of:		
	1 Connector body	36185-0005	02660 type 223
	5 Contacts, electrical	35817-1002	02660 220-S02
P3	Same as P1		
P4	CONNECTOR, Plug, electrical	36174	74868 type 27-841
P5	CONNECTOR, Plug, electrical, consisting of:		
	1 Connector body	36185-0009	02660 type 223
	9 Contacts, electrical	35817-1002	02660 220-S02
Q1	TRANSISTOR	36370-3055	79089 2N3055
Q2	Same as Q1		
R1	RESISTOR, Fixed, ww, 3 ohms ±5%, 5W	36604-9301	44655 type 995-5B
R2	RESISTOR, Fixed, comp, 47,000 ohms ±10%, 1/4 W	200-0473	01121 CB4731
R3	RESISTOR, Variable, 100 ohms ±20%, 1/2 W	8915-0101	01121 GLU1012 SD3028L
R4	RESISTOR, Fixed, comp, 22 ohms ±5%, 1/2 W	201-0220	01121 EB2205
R5	RESISTOR, Variable, 500 ohms ±30%, 1/20 W	35634-0501	71590 type 621-1
R6	RESISTOR, Variable, 500 ohms ±20%, 1/2 W	8915-0501	01121 GLU5012 SD3028L
R7	RESISTOR, Fixed, ww, 10 ohms ±5%, 5W	36604-0100	44655 type 995-5B
S1	SWITCH, Toggle, DPDT	36006-0002	95146 MST-205R

C-131A CONTROL UNIT

Figure & Index No.	ARC Part No.	Description 1 2 3 4 5 6	Qty per Assy
7-1-	37250-0000	CONTROL UNIT ASSEMBLY, C-131A	1
	37250-2000	CONTROL UNIT ASSEMBLY, C-131A, Option No. 1	1
	37250-3000	CONTROL UNIT ASSEMBLY, C-131A, Option No. 2	1
-1	37634-0001	. COVER ASSEMBLY (used in 37250-0000 only)	1
		(ATTACHING PARTS)	
-2	104-0016	. SCREW, Machine, bind. hd, brs, ni pl, No. 4-40 thd by 1/4 in. lg . . . (used in 37250-0000 only)	2
		- - - * - - -	
-3	29157	. KNOB (used in 37250-0000 and -2000 only)	1
		(ATTACHING PARTS)	
-4	302-0008	. SETSCREW, Fluted soc dr, cup pt, stl, cad. pl, No. 2-56 . . . . . thd by 1/8 in. lg (used in 37250-0000 and -2000 only)	2
		- - - * - - -	
-5	29001	. KNOB (used in 37250-0000 and -2000 only)	1
-5	39132	. KNOB (used in 37250-3000 only)	1
		(ATTACHING PARTS)	
-6	304-0012	. SETSCREW, Fluted soc dr, cup pt, stl, cad. pl, No. 4-40 thd by . . . 3/16 in. lg.	2
		- - - * - - -	
-7	28998	. KNOB	1
		(ATTACHING PARTS)	
-8	304-0012	. SETSCREW, Fluted soc dr, cup pt, stl, cad. pl, No. 4-40 thd by . . . 3/16 in. lg	2
		- - - * - - -	
-9	38587-0000	. MASK ASSEMBLY (used in 37250-0000 only)	1
		(ATTACHING PARTS)	
-10	113-0032	. SCREW, Machine, bind. hd. brs, blk oxidized, No. 3-48 thd by 1/2 . . in. lg. (used in 37250-0000 only)	2
-11	10353	. WASHER, Spring tension (used in 37250-0000 only)	2
		- - - * - - -	
-12	37446-0003	. PANEL, Printed (used in 37250-0000 only)	1
-13	14562	. EMBLEM (used in 37250-0000 only)	1
		(ATTACHING PARTS)	
-14	8040	. NUT, Hexagon, brs, ni pl, No. 4-40 thd (used in 37250-0000 only). . .	1
-15	7730	. WASHER, Spring tension (used in 37250-0000 only)	1
		- - - * - - -	
-16	37637	. PRINTED CIRCUIT ASSEMBLY (used in 37250-0000 only)	1
		PARTIAL BREAKDOWN FOLLOWS	
-17	36183-0002	. . FILTER, Blue (used in 37250-0000 only)	4
-18	32971-0003	. . LAMP, Incandescent, clear, 5v, 0.115 amp $\pm$10 percent . . . . . (71744 part no. 715) (used in 37250-0000 only)	4
-19	27029	. PLATE, Adapter (used in 37250-0000 only)	1
		(ATTACHING PARTS)	
-20	154-0016	. SCREW, Machine, fh, brs, blk oxidized, No. 4-40 thd by 1/4 in. lg. . . (used in 37250-0000 only)	4
		- - - * - - -	
-21	37595-0002	. PLATE ASSEMBLY (used in 37250-0000 only)	1

Figure & Index No.	ARC Part No.	Description 1 2 3 4 5 6	Qty per Assy
		(ATTACHING PARTS)	
7-1-22	144-0012	. SCREW, Machine, fh, brs, ni pl, No. 4-40 thd by 3/16 in. lg . . . . . (used in 37250-0000 only)	4
		- - - * - - -	
-23	35554-0510	. LIGHT, Indicator, 0.06 amps ±10 percent, 5 Vdc (72765 . . . . . part no. 6039-000-704 GREEN) (used in 37250-0000 only)	1
		(ATTACHING PARTS)	
-24	—	. NUT, Hexagon, brs, ni pl, No. 10-32 thd (supplied with . . . . . 35554-0510) (used in 37250-0000 only)	1
		- - - * - - -	
-25	36006-0003	. SWITCH, Toggle, DPDT, 115, 5 amp (95146 part no. MST-205S) . . . (used in 37250-0000 only)	1
		(ATTACHING PARTS)	
-26	—	. NUT, Hexagon, brs, ni pl, 1/4-40 thd (supplied with. . . . . 36006-0003) (used in 37250-0000 only)	2
-27	—	. WASHER, Lock, int tooth, brz, zi pl, 1/4 in. . . . . (supplied with 36006-0003) (used in 37250-0000 only)	1
-28	—	. WASHER, Key, brs, ni pl, 1/4 in. (supplied with 36006-0003) . . . . . (used in 37250-0000 only)	1
		- - - * - - -	
-29	342-0680	. RESISTOR, Fixed, comp, 68 ohms ±10 per cent, ... 1 w (01121 part no. GB 6801) (used in 37250-0000 only)	1
-30	37709	. BRACKET, Stop	1
		(ATTACHING PARTS)	
-31	502-0010	. SCREW, Assembled washer, brs screw, ni pl, sst lockwasher . . . . . No. 2-56 by 5/32 in. lg (78189 type SEMS)	1
		- - - * - - -	
-32	39112-0103	. RESISTOR, Variable, carbon comp, 10,000 ohms . . . . . ±20 percent, 1 w, with DPST switch, 10 amp, 10 vdc, mounted on rear of resistor (used in 37250-0000 and -2000 only)	1
		(ATTACHING PARTS	
-33	—	. NUT, Hexagon, CRES, 3/8-32 thd (supplied with 39912-0103). . . . . (used in 37250-0000 and -2000 only)	1
-34	—	. WASHER, Lock, int tooth, CRES, 3/8 in. (supplied with 39912-0103). (used in 37250-0000 and -2000 only)	1
-35	13110	. WASHER, Flat, brs, ni pl, 0.380 ID by 0.562 OD by 0.020 in. thk . . . (used in 37250-0000 and -2000 only)	1
		- - - * - - -	
-36	32847	. COUPLING (used in 37250-0000 and -2000 only)	1
-37	32848-0510	. SHAFT (used in 37250-0000 and -2000 only)	1
-38	37252-0000	. PLATE, Identification (used in 37250-0000 only)	1
-38	37252-2000	. PLATE, Identification (used in 37250-2000 only)	1
-38	37252-3000	. PLATE, Identification (used in 37250-3000 only)	1
		(ATTACHING PARTS)	
-39	8956-2010	. SCREW, Tapping, thd forming, stl, blk oxidized, No. 2 by 5/32 in. . . lg (45722 type Z)	2
		- - - * - - -	
-40	37735	. CONTROL UNIT SUBASSEMBLY	1
-41	35862-0001	. . GUIDE, Socket (81312 type G700)	1
		(ATTACHING PARTS)	
-42	—	. . NUT, Hexagon, brs, gold pl, No. 4-40 thd . . . . . (supplied with 35862-0001)	1

Figure & Index No.	ARC Part No.	Description 1 2 3 4 5 6	Qty per Assy
7-1-43	—	. . WASHER, Lock, int tooth, brz, gold pl, No. 4 ..... (supplied with 35862-0001)	1
		- - - * - - -	
-44	35862-0002	. . GUIDE, Pin (81312 type G700) ..... (ATTACHING PARTS)	1
-45	—	. . NUT, Hexagon, brs, gold pl, No. 4-40 thd ..... (supplied with 35862-0002)	1
-46	—	. . WASHER, Lock, int tooth, brz, gold pl, No. 4 ..... (supplied with 35862-0002)	1
		- - - * - - -	
-47	2544	. . TERMINAL, Lug.....	2
-48	35861-2120	. . CONTACT, Electrical (81312 part no. 100-2020P)	33
-49	35860-0134	. . BODY, Electrical connector (81312 part no. MRAC-34 P)..... (ATTACHING PARTS)	1
-50	164-0024	. . SCREW, Machine, fil h, brs, ni pl, No. 4-40 thd by 3/8 in. lg.....	4
-51	8040	. . NUT, Hexagon, brs, ni pl, No. 4-40 thd.....	4
-52	13046	. . WASHER, Flat, brs, cad. 0.114 ID by 0.203 OD ..... by 0.020 in. thk	4
-53	15155	. . WASHER, Flat,al, 0.120 ID by 0.234 OD by 0.032 in. thk.....	4
		- - - * - - -	
-54	29916-0001	. . LOCK, Connector (81312 part no. MRE-V).....	1
-55	8625-9104	. . CAPACITOR, Fixed, ceramic, 0.0010 uF +100 —0 percent,..... 500 Vdcw	1
-56	37604	. . BRACKET ASSEMBLY ..... (ATTACHING PARTS)	1
-57	504-0016	. . SCREW, Assembled washer, bind. hd, brs screw, ni pl, ... sst lockwasher, No. 4-40 thd by 1/4 in. lg (78189 type SEMS)	4
		- - - * - - -	
-58	28996-0052	. . SPACER ..... (ATTACHING PARTS)	2
-59	504-0016	. . SCREW, Assembled washer, bind. hd, brs screw, ni pl, sst lockwasher, No. 4-40 thd by 1/4 in. lg (78189 type SEMS)	2
		- - - * - - -	
-60	28996-0148	. . SPACER ..... (ATTACHING PARTS)	2
-61	504-0016	. . SCREW, Assembled washer, bind. hd, brs screw, ni. pl, ... sst. lockwasher, No. 4-40 thd by 1/4 in. lg (78189 type SEMS)	2
		- - - * - - -	
-62	34410	. . SEMICONDUCTOR DEVICE, Diode (93332 part no. IN270).....	8
-63	37727	. . SWITCH ASSEMBLY ..... (ATTACHING PARTS)	1
-64	504-0016	. . SCREW, Assembled washer, bind. hd, brs screw, ni pl, ... sst lockwasher, No. 4-40 thd by 1/4 in. lg (78189 type SEMS)	4
		- - - * - - -	
-65	32865	. . . PLATE, Rear ..... (ATTACHING PARTS)	1
-66	135-0056	. . . SCREW, Machine, rh, brs, black oxidize, No, 5-40 by 7/8 in. lg. .	2
-67	8734	. . . WASHER, Lock, split, brz, ni pl, No. 5	2
		- - - * - - -	
-68	32849-0032	. . . SPACER	2
-69	32823-0008	. . . SWITCH SECTION, Rotary	1
-70	32849-0008	. . . SPACER	2

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Qty per Assy
7-1-71	28665-0025	. . . RING, Retaining (79136 part no. 5100-25-MD)	1
-72	1049	. . . WASHER, Flat, ni silver, 0.257 ID by 0.500 OD by . . . . . 0.008 in. thk	1
-73	37737	. . PLATE ASSEMBLY	1
		(ATTACHING PARTS)	
-74	504-0016	. . . SCREW, Assembled washer, bind. hd, brs screw, ni pl, ... sst lockwasher, No. 4-40 thd by 1/4 in. lg (78189 type SEMS)	3
		- - - * - - -	
-75	8141	. . . BALL, Bearing	1
		(ATTACHING PARTS)	
-76	308-0008	. . . SETSCREW, Fluted soc dr, cup pt, stl, cad. pl, ... No. 8-32 thd by 1/8 in. lg.	1
-77	20348	. . . SPRING, Helical, compression	1
		- - - * - - -	
-78	37780	. . . SPACER	1
		(ATTACHING PARTS)	
-79	504-0016	. . . SCREW, Assembled washer, bind. hd, brs screw, ni pl, ... sst. lockwasher, No. 4-40 thd by 1/4 in. lg (78189 type SEMS)	1
		- - - * - - -	
-80	28996-0042	. . . SPACER.	2
		(ATTACHING PARTS)	
-81	504-0016	. . . SCREW, Assembled washer, bind. hd, brs screw, ni pl, ... sst lockwasher, No. 4-40 thd by 1/4 in. lg (78189 type SEMS)	2
		- - - * - - -	
-82	27781	. . . BEARING	1
-83	6376	. . . WASHER, Flat, CRES, 0.130 ID by 0.219 OD by 0.0062 in. thk	1
-84	37620	. . . GEAR ASSEMBLY	1
		(ATTACHING PARTS)	
-85	302-0008	. . . SETSCREW, Fluted soc dr, cup pt, stl, cad. pl, No. 2-56 . . . . . thd by 1/8 in. lg	1
		- - - * - - -	
-86	37621	. . . SHAFT	1
		(ATTACHING PARTS)	
-87	37222-0012	. . . RING, Retaining (79136 part no. 5103-12-MD)	1
-88	6376	. . . WASHER, Flat, CRES, 0.130 ID by 0.219 OD by 0.0062 in. thk	1
		- - - * - - -	
-89	27781	. . . BEARING	1
-90	1640	. . . WASHER, Flat, ni silver, 0.251 ID by 0.437 OD by . . . . . 0.008 in. thk	2
-91	29184	. . . GEAR, Spur	1
		(ATTACHING PARTS)	
-92	303-0012	. . . SETSCREW, Fluted soc dr, cap pt, stl, cad. pl, No. 3-48 thd by 3/16 in. lg	2
		- - - * - - -	
-93	37623	. . . SHAFT	1
-94	29794	. . . SPRING, Helical extension	1
-95	30832	. . . STRAP ASSEMBLY.	1

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Qty per Assy
		(ATTACHING PARTS)	
7-1-96	28665-0012	. . . RING, Retaining (79136 part no. 5100-12-C)	1
-97	6376	. . . WASHER, Flat, CRES, 0.130 ID by 0.219 OD by 0.0062 in. thk	1
		- - - * - - -	
-98	37577	. . . CAM ASSEMBLY	1
		(ATTACHING PARTS)	
-99	304-0012	. . . SETSCREW, Fluted soc dr, cup pt, stl, cad. pl, No. 4-40 thd by 3/16 in. lg	2
		- - - * - - -	
-100	1049	. . . WASHER, Flat, ni silver, 0.257 ID by 0.500 OD by 0.008 in. thk	1
-101	32823-0009	. . . SWITCH SECTION, Rotary	1
		(ATTACHING PARTS)	
-102	135-0020	. . . SCREW, Machine, rh, brs, blk oxidized, No. 5-40 thd by 5/16 in. lg	2
-103	8734	. . . WASHER, Lock, split, brz, ni pl, No. 5	2
		- - - * - - -	
-104	32849-0006	. . . SPACER	2
-105	37624	. . . SHAFT	1
		(ATTACHING PARTS)	
-106	28665-0025	. . . RING, Retaining (79136 part no. 5100-25-MD)	1
-107	1049	. . . WASHER, Flat, ni silver, 0.257 ID by 0.500 OD by 0.008 in. thk	1
		- - - * - - -	
-108	37622	. . . PLATE ASSEMBLY	1
-109	28996-0029	. . SPACER	4
		(ATTACHING PARTS)	
-110	504-0016	. . SCREW, Assembled washer, bind. hd, brs screw, ni pl, sst lockwasher, No. 4-40 thd by 1/4 in. lg (78189 type SEMS)	4
		- - - * - - -	
-111	27790	. . COLLAR	1
		(ATTACHING PARTS)	
-112	304-0008	. . SETSCREW, Fluted soc dr, cup pt, stl, cad. pl, No. 4-40 thd by 1/8 in. lg	2
		- - - * - - -	
-113	27781	. . RING	1
-114	37606	. . GEAR, Spur	1
		(ATTACHING PARTS)	
-115	27791-4024	. . SCREW, Machine, hex hd, sst, No. 4-40 thd by 3/8 in. lg.	1
-116	8040	. . NUT, Hexagon, brs, ni pl, No. 4-40 thd	1
-117	22341	. . WASHER, Lock, split, sst, No. 4	1
-118	23193	. . WASHER, Flat, sst, 0.1285 ID by 0.344 OD by 0.003 in. thk.	2
		- - - * - - -	
-119	29002	. . BEARING	1
-120	29184	. . GEAR, Spur	1
		(ATTACHING PARTS)	
-121	303-0012	. . SETSCREW, Fluted soc dr, cup pt, stl, cad. pl, No. 3-48 thd by 3/16 in. lg	2
		- - - * - - -	
-122	37606	. . GEAR, Spur	1

Figure & Index No.	ARC Part No.	Description 1 2 3 4 5 6	Qty per Assy
		(ATTACHING PARTS)	
7-1-123	27791-4024	. . SCREW, Machine, hex hd, sst, No. 4-40 thd by 3/8 in. lg.	1
-124	8040	. . NUT, Hexagon, brs, ni pl, No. 4-40 thd	1
-125	8497	. . WASHER, Lock, int tooth, sst, No. 4.	1
-126	23193	. . WASHER, Flat, sst, 0.125 ID by 0.344 OD by 0.003 in. thk. . . .	2
		- - - * - - -	
-127	29002	. . BEARING	1
-128	37169	. . GEAR, Pinion	1
		(ATTACHING PARTS)	
-129	302-0006	. . SETSCREW, Fluted soc dr, cup pt, stl, cad. pl, ... No. 2-56 thd by 3/32 in. lg	2
-130	37736	. . BEARING	1
-131	37625-0002	. . PLATE, Mounting	1
		(ATTACHING PARTS)	
-132	124-0116	. . SCREW, Machine, rh, brs, ni pl, No. 4-40 thd by 1-1/4 in. lg.	4
-133	8497	. . WASHER, Lock, int tooth, sst, No. 4.	4
-134	37613-0059	. . SPACER.	4
-135	28996-0046	. . SPACER.	4
		- - - * - - -	
-136	27786-0000	. . GEAR, Spur	1
		(ATTACHING PARTS)	
-137	303-0006	. . SETSCREW, Fluted soc dr, cap pt, stl, cad. pl, ... No. 3-48 thd by 3/32 in. lg	2
		- - - * - - -	
-138	27789-0000	. . GEAR, Helical.	2
		(ATTACHING PARTS)	
-139	303-0006	. . SETSCREW, Fluted soc dr, cup pt, stl, cad. pl, ... No. 3-48 thd by 3/32 in. lg	4
		- - - * - - -	
-140	28995-0208	. . SHAFT	2
-141	27781	. . BEARING	2
-142	27794	. . GEAR, Spur	1
		(ATTACHING PARTS)	
-143	303-0008	. . SETSCREW, Fluted soc dr, cup pt, stl, cad. pl, ... No. 3-48 thd by 1/8 in. lg	2
		- - - * - - -	
-144	34410	. . SEMICONDUCTOR DEVICE, Diode (93332 part no. 1N270).	8
-145	37574-0005	. . SWITCH SECTION, Rotary	1
		(ATTACHING PARTS)	
-146	135-0028	. . SCREW, Machine, rh, brs, blk oxidized, No. 5-40 thd by 7/16 . . . in. lg	2
-147	3889-0000	. . WASHER, Spring tension	2
-148	38485-0000	. . WASHER, Nonmetallic, phenolic, 0.140 ID by 0.250 OD . . . . . by 0.031 in. thk (86928 part no. 5620-32-31)	2
-149	32849-0010	. . SPACER.	2
-150	37574-0002	. . SWITCH SECTION, Rotary	1
-151	33264-0021	. . SPACER, Threaded end, No. 5-40 int thd one end, ... No. 6-32 int thd other end	2
		(ATTACHING PARTS)	
-152	506-0016	. . SCREW, Assembled washer, bind. hd, brs screw, ni pl, sst. . . . . lockwasher, No. 6-32 thd by 1/4 in. lg (78189 type SEMS)	2
		- - - * - - -	

Figure & Index No.	ARC Part No.	Description 1 2 3 4 5 6	Qty per Assy
7-1-153	34410	. . SEMICONDUCTOR DEVICE, Diode (93332 part no. 1N270)	1
-154	30188-0151	. . RESISTOR, Fixed, ww, 150 ohms ±5 percent, 3 w (56289 type 242E)	1
-155	37725	. . PLATE AND COUNTER ASSEMBLY	1
-156	29794	. . . SPRING, Helical, extension	1
-157	33165	. . . STRAP ASSEMBLY	1
		(ATTACHING PARTS)	
-158	28665-0012	. . . RING, Retaining (79136 part no. 5100-12-C)	1
-159	6376	. . . WASHER, Flat, CRES, 0.130 ID, 0.219 OD by 0.0062 in. thk	1
		- - - * - - -	
-160	37579	. . . CAM ASSEMBLY	1
		(ATTACHING PARTS)	
-161	304-0008	. . . SETSCREW, Fluted soc dr, cup pt, stl, cad. pl, No. 4-40 thd by 1/8 in. lg	2
-162	2670	. . . WASHER, Flat, brz, ni pl, 0.380 ID by 0.562 OD by 0.010 in. thk	1
		- - - * - - -	
-163	8107	. . . BALL, Bearing	2
		(ATTACHING PARTS)	
-164	304-0006	. . . SETSCREW, Fluted soc dr, cup pt, stl. cad. pl, No. 4-40 thd by 3/32 in. lg	2
-165	33558-0001	. . . SPRING, Helical, compression	2
		- - - * - - -	
-166	29128-0502	. . . WINDOW ASSEMBLY, Magnifier	1
		(ATTACHING PARTS)	
-167	162-0012	. . . SCREW, Machine, fil h, brs, ni pl, No. 2-56 thd by 3/16 in. lg	4
-168	4550	. . . WASHER, Flat, brs, cad, pl, 0.099 ID by. 0.187 OD by 0.020 in. thk	4
		- - - * - - -	
		PARTIAL BREAKDOWN FOLLOWS	
-169	36366-0500	. . . . LAMP FIXTURE (02006 part no. LP-9121-3)	2
		(ATTACHING PARTS)	
-170	–	. . . . SCREW, Machine, fh, nylon, 0-80thd, (supplied with 36366-0500)	4
-171	37627	. . . GEAR ASSEMBLY	1
-172	33637	. . . GEAR ASSEMBLY	1
		(ATTACHING PARTS)	
-173	302-0004	. . . SETSCREW, Fluted soc dr, cup pt, stl, cad. pl, No. 2-56 thd by 1/16 in. lg	4
-174	3281-0000	. . . WASHER, Flat, ni silver, 0.251 ID by 0.344 OD by 0.0063 in. lg	AR
		- - - * - - -	
-175	28989	. . . BEARING	2
-176	34328	. . . BRACKET, Counter	1
-177	34329	. . . BRACKET, Counter	1

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Qty per Assy
		(ATTACHING PARTS)	
7-1-178	142-0012	. . . SCREW, Machine, fh, brs, ni pl, No. 2-56 thd by 3/16 in. lg	4
		- - - * - - -	
-179	37547	. . . COUNTER	1
-180	34351	. . . BRACKET	1
		(ATTACHING PARTS)	
-181	142-0016	. . . SCREW, Machine, fh, brs, ni pl, No. 2-56 thd by 1/4 in. lg	2
-182	8275	. . . NUT, Hexagon, brs, ni pl, No. 2-56 thd	2
-183	4052	. . . WASHER, Lock, int tooth, sst, No. 2	2
-184	34350	. . . SPACER	2
		- - - * - - -	
-185	14699	. . . TERMINAL ASSEMBLY	1
		(ATTACHING PARTS)	
-186	143-0016	. . . SCREW, Machine, fh, brs, ni pl, No. 3-48 thd by 1/4 in. lg	1
-187	4103	. . . WASHER, Lock, int tooth, sst, No. 3	1
		- - - * - - -	
-188	32825-0244	. . . SHAFT	1
		(ATTACHING PARTS)	
-189	28665-0037	. . . RING, Retaining (79136 part no. 5100-37-MD)	1
-190	13110	. . . WASHER, Flat, brs, ni pl, 0.380 ID by 0.562 OD by 0.020 in. thk	1
		- - - * - - -	
-191	37629-0002	. . . PLATE SUBASSEMBLY	1

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S3	101	32823-0009
S4	69	32823-0008
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S6	32	39112-0103
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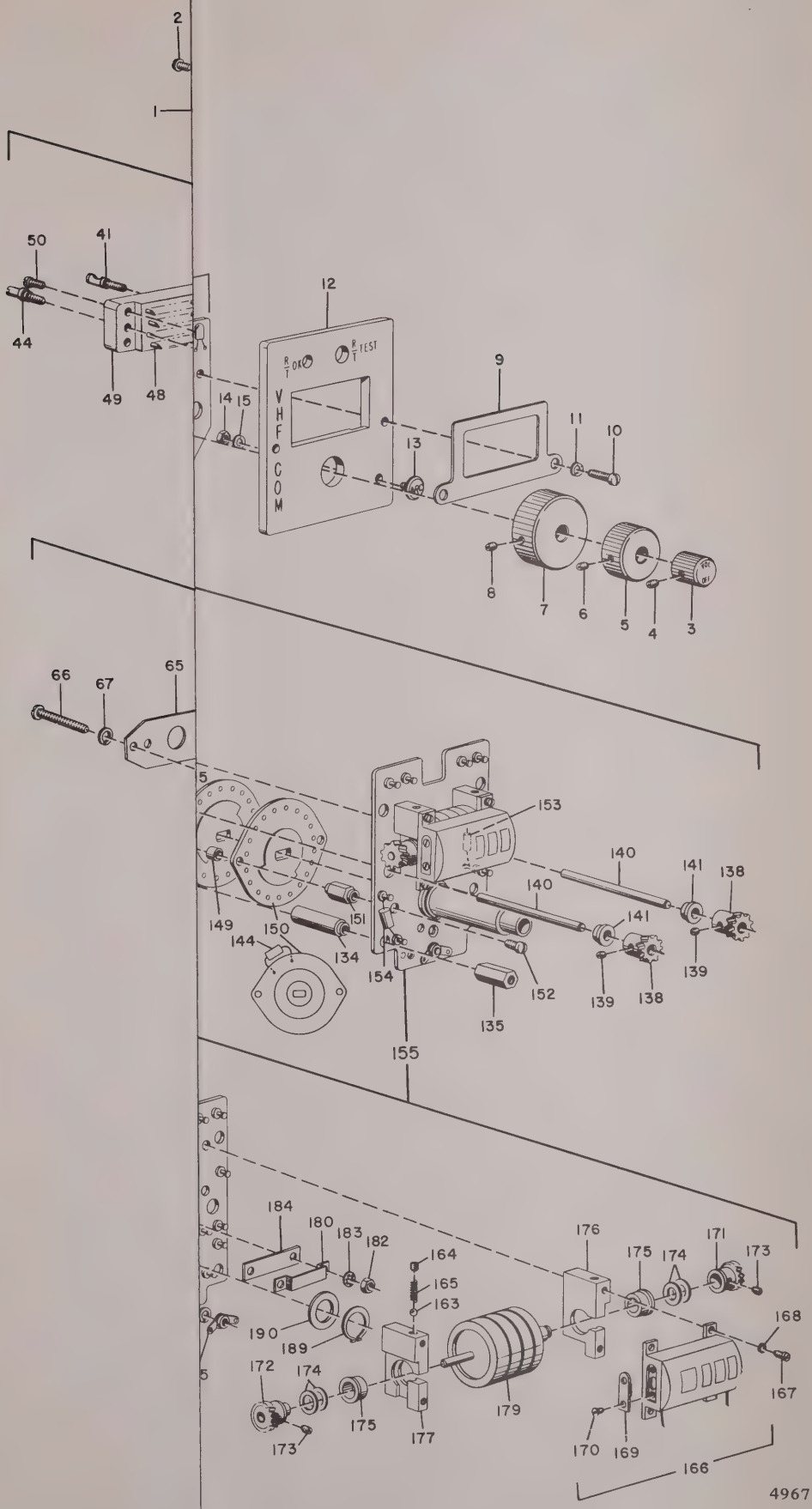

Figure 7–1. C-131A Control Unit, Exploded View

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CR6	139	34410
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R4	32	39112-0103
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S3	101	32823-0009
S4	69	32823-0008
S5	25	36006-0003
S6	32	39112-0103
S7	32	39112-0103

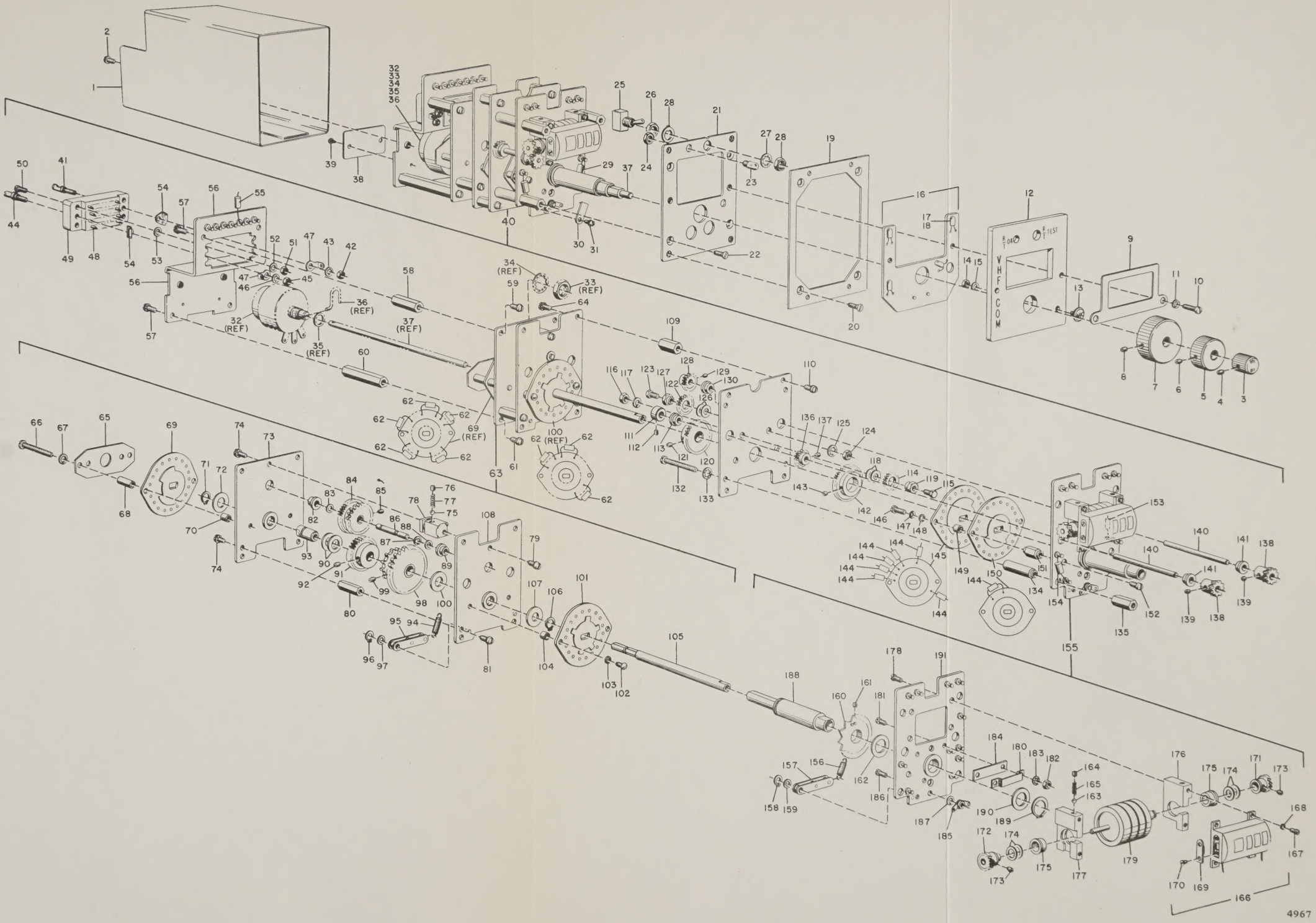

Figure 7–1. C-131A Control Unit, Exploded View

Aircraft Radio Corporation